

Poročilo o delu 2019

Annual report 2019



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Ljubljana 2020

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for controlling plant pests

Koruzni hrošč (*Diabrotica v. virgifera*) objeda listje kornice v okviru preskušanja toksičnosti
egerolizinskih proteinov izoliranih iz bukovega ostrigarja. / *Western corn rootworm*
(*Diabrotica v. virgifera*) feeding on maize leaves in toxicity assessment of aegerolysin proteins
isolated from *Pleurotus* mushrooms.

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Ljubljana 2020



2019



Kmetijski inštitut Slovenije
Agricultural Institute of Slovenia

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izr. prof. dr. / Assoc. Prof. Dr Andrej Simončič.

Uvodna beseda direktorja



Preface by the director

Spoštovani,
pred vami je strnjeno poročilo o delovanju Kmetijskega inštituta Slovenije (KIS) za leto 2019. Kljub temu pa bi se želel najprej vrniti v leto 2018 in opozoriti na pomemben dogodek, ko je KIS obeležil 120 let svojega delovanja. KIS je v tem času prehodil ogromno pot, v vsem tem času pa si je prizadeval, da bi v kar največji meri prispeval k razvoju kmetijstva in blagostanja, ki ga znanost in stroka lahko ponudita. Leto 2018 je bilo pomembno tudi zato, ker smo na KIS pripravili novo strategijo razvoja 2019–2023, v okviru katere smo si zadali številne ambiciozne cilje, za katere pa smo upravičeno prepričani, da jih bomo uspeli realizirati. Na KIS namreč razpolagamo z ogromno znanja in izkušenj. Zaposlujeemo že preko 200 raziskovalcev ter strokovnih in administrativnih sodelavcev. Poslujemo na štirih lokacijah – v Ljubljani, Jabljah pri Mengšu, Mostah pri Komendi ter na Brdu pri Lukovici. KIS je glede na velikost in obseg razvojno–raziskovalnega in strokovnega dela vodilni javni raziskovalni zavod na področju kmetijskih ved v Sloveniji. Ker postaja kmetijstvo vedno bolj kompleksno, so tudi naše aktivnosti temu primerno čedalje bolj interdisciplinarne. Zato se naše temeljne, predvsem pa aplikativne raziskave intenzivno širijo tudi na področja biotehnologije, fiziologije, okoljske kemije, okoljskega zdravstva, avtomatizacije in digitalizacije, energetike in še bi lahko našteval. Pri svojem delu sodelujemo s številnimi domačimi raziskovalnimi institucijami, hkrati pa vseskozi močno krepimo našo razvejano mednarodno sodelovanje. In to vse v korist trajnostnega kmetijstva, prilagajanja le-tega podnebnim spremembam, ob hkratni skrbi za varstvo okolja. Močno si prizadevamo, da bi s svojim znanstveno–raziskovalnim in strokovnim delom soustvarjali in razvijali kmetijsko stroko in hkrati pomagali kreirati kmetijsko politiko v prid našemu kmetu kot tudi družbi v širšem smislu. Rezultate raziskav in svojega dela uspešno prenašamo v prakso v obliki svetovalnega dela,

predavanj, usposabljanj, patentov, novih sort ter znanstvenih in strokovnih publikacij. Pomembno dejavnost inštituta predstavlja tudi sodelovanje naših zaposlenih v pedagoškem procesu na naših visokošolskih institucijah, ki izvajajo programe s področja kmetijstva in okolja ter izobraževanje in vzgoja mladih raziskovalcev, doktorskih študentov. Pri tem dobro sodelujemo tudi z gospodarstvom. Pomembno poslanstvo KIS-a je strokovna podpora različnim službam ministrstev in njihovim organom/agencijam ter izvajanje analiz in ekspertiz v podporo politikam na področjih kmetijstva in varstva okolja. Na ta način je inštitut že vrsto let močno vpet v gospodarska in agrarno-politična dogajanja, kjer z rezultati svojega dela pomembno prispevamo k čim boljši oceni stanja v kmetijstvu ter okolju pri nas ter nudimo zakonodajni in izvršni oblasti ustrezne podlage za pripravo strategije razvoja kmetijstva kot tudi drugih strateških dokumentov. V nadaljevanju vam nekatere najpomembnejše poudarke našega delovanja nekoliko podrobneje predstavljamo.



Dear Reader,

This is a concise report on the work of the Agricultural Institute of Slovenia (AIS) for 2019. But first I would like to return to 2018 to highlight a landmark event, the Institute's 120th anniversary. Since its inception, the AIS has had a remarkable journey, throughout which it has endeavoured to contribute to the development of agriculture and prosperity to the maximum extent offered by science and the agricultural profession. Another reason why 2018 was important is because we adopted a new development strategy for the period 2019–2023. The document set out many ambitious objectives, but we are rightly confident that we will be able to achieve them given the AIS's wealth of know-how and experience. We have a staff of over 200 researchers, assistants, and administrative staff working at four locations: Ljubljana, Jablje, Moste

near Komenda and Brdo pri Lukovici. Its size and the scope of its research and expert services make the AIS the leading agricultural research institute in Slovenia. With agriculture becoming increasingly complex, our activities have accordingly become more interdisciplinary. Our basic as well as applied research has thus been rapidly expanding to include biotechnology, physiology, environmental chemistry, environmental health, automation and digitisation, energy, and other areas. We collaborate with numerous domestic research institutions while constantly strengthening our diverse international cooperation. And we are doing this to the benefit of sustainable agriculture, the adaptation of agriculture to climate change, and concern for the protection of the environment. We are dedicated to co-creating and developing agriculture with our scientific research and expert activities, while helping to shape agricultural policy for the benefit of our farmers and society at large. The results of our research and activities are successfully translated into practice in the form of advisory services, lectures, training, patents, new varieties, and scientific publications. Another major contribution of the Institute is the participation of our staff in the teaching process at Slovenian institutions of higher education offering agricultural and environmental science courses, and the training of early stage researchers and PhD students. In this segment we have forged strong ties with business. One of the main missions of the AIS is to provide expert support to a variety of government departments and agencies, and to conduct analyses and expert reports supporting agricultural and environmental protection policies. As such, the Institute has long been a strong actor in economic and agricultural policy developments, where the results of its work have contributed significantly to improving the state of agriculture and the environment in Slovenia and provided the executive and legislative branches of government with expert groundwork for drafting the agricultural development strategy and other strategic documents. Below follows a somewhat more detailed presentation of some of the most important aspects of our work.



Kmetijski inštitut Slovenije v letu 2019 / Agricultural Institute of Slovenia in 2019

Kmetijski inštitut Slovenije v letu 2019

*Agricultural Institute
of Slovenia in 2019*

1.1 Organiziranost

Organisation

Direktor / *Director*

izr. prof. dr. / *Assoc. Prof. Dr* **Andrej Simončič**

Upravni odbor / *Management Board*

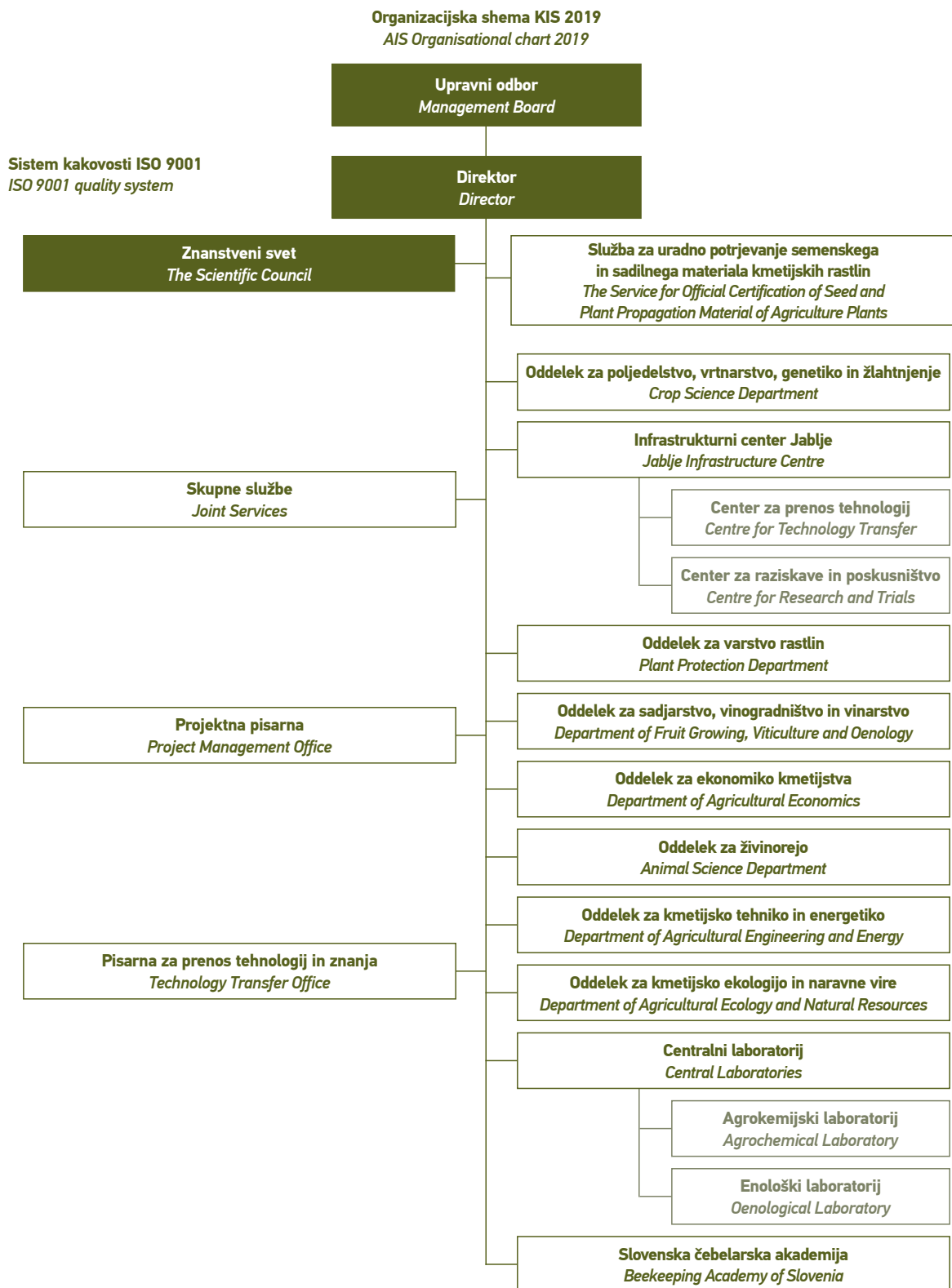
Upravni odbor Kmetijskega inštituta Slovenije (KIS) je v mandatnem obdobju 2018–2022 konstituiran v sestavi

/ *The composition of the AIS Management Board in the 2018–2022 term:*

- **Mateja Tilia**
predsednica, na predlog ministrstva pristojnega za raziskovalno dejavnost
/ *The president, on the proposal of the ministry responsible for research,*
- **Lidija Lipič Berlec**
članica na predlog ministrstva pristojnega za kmetijstvo, gozdarstvo in prehrano
/ *One member, on the proposal of the ministry responsible for agriculture, forestry, and food,*
- **Irena Anica Oven**
članica na predlog ministrstva pristojnega za okolje in prostor
/ *One member, on the proposal of the ministry responsible for the environment and spatial planning,*
- **Jana Erjavec**
predstavnica iz vrst uporabnikov oziroma zainteresirane javnosti
/ *A representative of users and interested parties,*
- prof. dr. / *Prof. Dr* **Franc Štampar**
predstavnik iz vrst uporabnikov oziroma zainteresirane javnosti / *A representative of users and interested parties,*
- mag. / *MSc* **Miran Naglič**
predstavnik iz vrst uporabnikov oziroma zainteresirane javnosti / *A representative of users and interested parties,*
- izr. prof. dr. / *Assoc. Prof. Dr* **Marjeta Čandek-Potokar**
izvoljena iz vrst zaposlenih na KIS / *An AIS employee representative*

Znanstveni svet / *The Scientific Council*

- izr. prof. dr. / *Assoc. Prof. Dr* **Marjeta Čandek-Potokar**, predsednica / *The president*
- izr. prof. dr. / *Assoc. Prof. Dr* **Andrej Simončič**, direktor KIS / *Director AIS*
- dr. / *Dr* **Barbara Gerič Stare**
- izr. prof. dr. / *Assoc. Prof. Dr* **Borut Vrščaj**
- dr. / *Dr* **Kristina Ugrinović**
- dr. / *Dr* **Špela Velikonja Bolta**
- **Tomaž Cunder**



1.2 Zaposleni

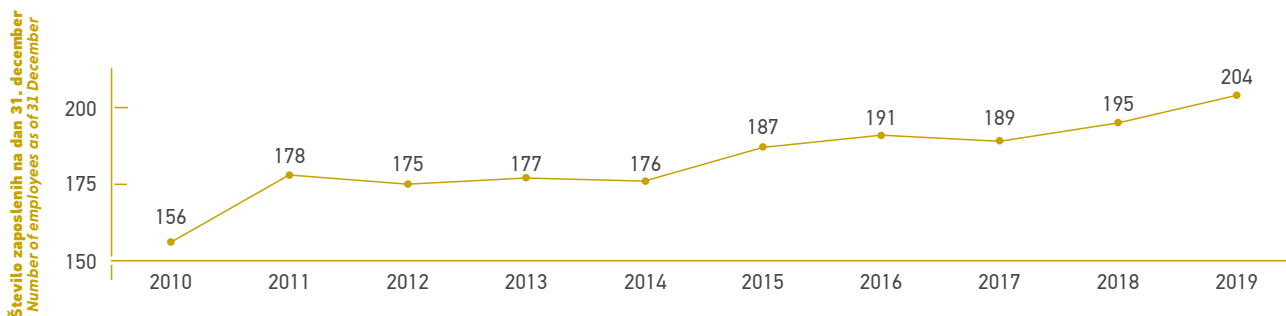
Staff

V letu 2019 smo na Kmetijskem inštitutu Slovenije presegli število 200 zaposlenih. Pri kadrovanju sledimo dvema ciljema. Prizadevamo si za kadrovanje v skladu s finančnimi zmožnostmi in zaposlovanju sodelavcev, ki izvajajo aktivnosti na področjih, ki dopolnjujejo ali nadgrajujejo obstoječe delo.

In 2019 the number of AIS staff exceeded 200. Our human resources policy pursues two objectives: staffing in line with financial capabilities and the hiring of staff with competences that supplement or expand on our existing activities.

Preglednica: Število zaposlenih na KIS v letih od 2010 do 2019

Table: Number of employees from 2010 to 2019

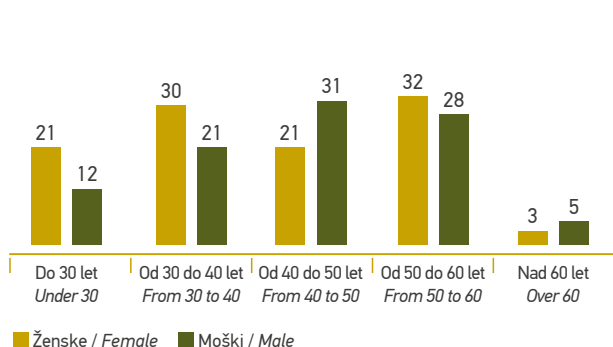


Leta 2019 je bilo med vsemi zaposlenimi 84 raziskovalcev, med njimi jih ima doktorat znanosti 54, magisterij 11 in visoko izobrazbo 19.

In 2019 there were 84 researchers among the employees, of which 54 held a PhD, 11 a master's degree, and 19 a bachelor's degree.

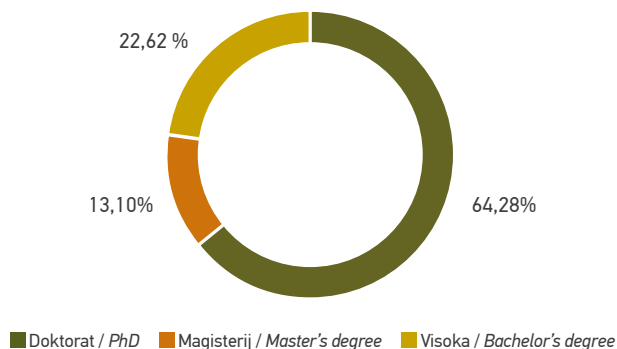
Graf: Starostna struktura zaposlenih na KIS 2019 po spolu

Chart: Age structure of AIS staff in 2019, by gender



Graf: Izobrazbena struktura raziskovalcev na KIS 2019

Chart: The educational structure of AIS researchers in 2019



1.3 Poslovanje

Financial operations

V poslovnem letu 2019 je bila večina zastavljenih ciljev dosežena. Ustvarili smo prihodke v višini 9.624.775 EUR in odhodke v višini 9.495.219 EUR ter poslovno leto zaključili s 129.556 EUR presežka prihodkov nad odhodki. Na področju javne službe je bil ustvarjen presežek prihodkov nad odhodki (175.983 EUR), na področju tržne dejavnosti pa presežek odhodkov nad prihodki (46.427 EUR).

Prihodki so bili za 99.173 EUR (1,0 %) nižji od načrtovanih. Tudi odhodki so bili za 2,4 % nižji od načrtovanih. V primerjavi z letom 2018 so bili prihodki višji za 821.231 EUR (9,3 %), odhodki pa za 817.256 EUR (9,4 %).

Prihodki, prejeti s strani ARRS, so znašali 2.834.993 EUR. Bili so nekoliko nižji od načrtovanih (indeks 96,4), saj smo del neporabljenih sredstev za financiranje materialnih stroškov programov in projektov prenesli v leto 2020. V primerjavi z letom 2018 so se povečala sredstva ARRS v absolutnem znesku za 472.965 EUR (indeks 120,0).

Prihodki na podlagi izvajanja strokovnih nalog in javnih služb, ki jih financirajo Ministrstvo za kmetijstvo, gozdarstvo in prehrano ter delno tudi Ministrstvo za okolje in prostor ter Ministrstvo za zdravje, so bili doseženi v načrtovani višini in so znašali 3.097.567 EUR (indeks 100,9). Bili so za 8,2 % višji od doseženih v letu 2018.

Zaradi uspešnosti pri pridobivanju novih projektov so se v letu 2019 zvišali prihodki z naslova tujih (evropskih) projektov za 2,6 % glede na realizacijo v letu 2018 in so znašali 869.648 EUR.

Most of the objectives for 2019 were achieved. We recorded revenue of EUR 9,624,775 and expenditure of EUR 9,495,219, finishing the financial year with a EUR 129,556 surplus of revenue over expenditure. The public services segment posted a surplus of revenue over expenditure (EUR 175,983), whereas in the commercial segment expenditure exceeded revenue (by EUR 46,427).

Overall revenue was EUR 99,173 (1.0%) less than planned, but expenditure was 2.4% lower than planned. Compared to 2018, revenue rose by EUR 821,231 (9.3%) and expenditure was up by EUR 817,256 (9.4%).

Funding from the Slovenian Research Agency (ARRS) stood at EUR 2,835,993 and was slightly lower than planned (index: 96.4) since a portion of the unused funds for the financing of the material costs of projects and programmes was carried over to 2020. Compared to 2018, ARRS funding rose by EUR 472,965 in nominal terms (index: 120.0).

Revenue stemming from the performance of expert tasks and public services, which are financed by the Ministry of Agriculture, Forestry and Food and to a lesser extent by the Ministry of the Environment and Spatial Planning and the Ministry of Health, were in line with plans and totalled EUR 3,097,567 (index: 100.9), which is an increase of 8.2% over 2018.

Having been successful in securing the approval of new projects in 2019, revenue stemming from foreign (EU) projects rose by 2.6% compared to 2018 and totalled EUR 869,648.

		DOSEŽENO / RESULT (ACHIEVED)
		2018
		EUR
PRIHODKI SKUPAJ / REVENUE TOTAL		8.803.544
MIZŠ – ARRS program, projekti idr. / Ministry of Education, Science and Sport – Slovenian Research Agency programme, projects, etc.		2.362.028
MKGP projekti / Ministry of Agriculture, Forestry and Food projects		305.469
MKGP Slovenska čebelarstva akademija / Ministry of Agriculture, Forestry and Food – Beekeeping Academy of Slovenia		79.999
Drugi proračunski prihodki / Other budget revenue		107.035
Strokovne naloge, javna služba MKGP, MOP / Expert tasks, public services, Ministry of Agriculture, Forestry and Food, Ministry of the Environment and Spatial Planning		2.861.920
Javna služba na trgu / Public services on the market		152.573
Projekti in povračila stroškov – tujina / Projects and reimbursement of costs – abroad		847.694
Prodaja blaga, proizvodov in storitev (pov./zmanj. zalog) / Sales of goods, products, and services (increase/decrease in inventories)		1.834.807
Subvencije, regresi, neposredna plačila, KOP / Subsidies, holiday allowance, direct payments, agri-environmental-climate payments		234.623
Finančni, drugi in prevrednotovalni prihodki / Financial, other, and revaluation revenue		17.396
ODHODKI SKUPAJ / TOTAL EXPENDITURE		8.677.963
Stroški / Costs		2.696.324
Amortizacija / Depreciation		482.523
Stroški dela / Labour costs		5.499.116
· Bruto plače in regres / Gross wages and holiday allowance		4.372.548
· Drugi stroški dela / Other labour costs		1.126.568
PRESEŽEK PRIHODKOV/ODHODKOV / SURPLUS OF REVENUE/EXPENDITURE		125.581
Davek od dohodkov pravnih oseb / Income tax		0
PRESEŽEK PRIHODKOV/ODHODKOV / SURPLUS OF REVENUE/EXPENDITURE		125.581

Situacija na trgu v letu 2019 ni bila ugodna. Zaradi slabih vremenskih razmer (toča) je bil pridelek semenskih trav in žit manjši od načrtovanega. Prav tako so bile nizke odkupne cene pridelkov.

The situation on the market was not favourable in 2019. Due to weather conditions (hail) the production of grass seeds and cereals was lower than planned. Producer prices were low as well.

DOSEŽENO / RESULT (ACHIEVED)	DOSEŽENO / RESULT (ACHIEVED)	DOSEŽENO / RESULT (ACHIEVED)	INDEKS / INDEX	INDEKS / INDEX
2018	2019	2019	Dosež. / Result 2019	Dosež. / Result 2019
%	EUR	%	Dosež. / Result 2018	Plan 2019
100	9.624.775	100	109,3	99
26,8	2.834.993	29,5	120	96,4
3,5	316.185	3,3	103,5	94,6
0,9	81.560	0,8	102	99,5
1,2	94.828	1	88,6	117,2
32,6	3.097.567	32,2	108,2	100,9
1,7	173.722	1,8	113,9	111,9
9,6	869.648	9	102,6	97,2
20,8	1.910.366	19,8	104,1	99,5
2,7	210.170	2,2	89,6	89,4
0,2	35.736	0,4	205,4	274,9
98,6	9.495.219	98,6	109,4	97,6
30,6	2.860.181	29,7	106,1	96,2
5,5	503.161	5,2	104,3	100,6
62,5	6.131.877	63,7	111,5	98,1
49,7	4.886.111	50,8	111,7	97,8
12,8	1.245.766	12,9	110,6	99,2
1,4	129.556	1,4	103,2	136.374,70
0	0	0	-	-
1,4	129.556	1,4	103,2	136.374,70

Prihodki na trgu so v letu 2019 znašali 2.155.158 EUR. Kljub temu, da so bili za 11,4 % višji od doseženih v letu 2018, niso zadoščali za pokritje nastalih odhodkov.

Revenue on the market stood at EUR 2,155,158, and even though this was 11.4% above the level achieved in 2018 it was not sufficient to cover the costs incurred.

1.4 Sistemi kakovosti

Quality systems

Pridobljeni certifikati in akreditacije, ki jih je KIS vzdrževal v letu 2019
Certificates and accreditations maintained by the AIS in 2019

PODROČJE / DEJAVNOST / AREA / ACTIVITY	IME / NAME	OPIS / DESCRIPTION
Kmetijski inštitut Slovenije / Agricultural Institute of Slovenia	SIST EN ISO 9001:2015	Sistem vodenja kakovosti 9001, certifikat Q-1120 / Quality management system 9001, certificate Q-1120
Semenski laboratorij / Seed Laboratory	ISTA	ISTA akreditacija / International Seed Testing Association (ISTA) Accreditation
Centralni laboratorij (Agrokemijski in Enološki laboratorij) / Central Laboratories (Agrochemical Laboratory and Oenological Laboratory)	SIST EN ISO/IEC 17025:2005	Slovenska akreditacija, Akreditacijska listina LP-020 / Slovenian accreditation, Accreditation Certificate LP-020
Oddelek za varstvo rastlin / Plant Protection Department	Javno pooblastilo za opravljanje nalog zdravstvenega varstva rastlin (Odločba št. 3430-533/2008/3 z dne 03.06.2013 in spremembe) / Public authorisation for the performance of plant protection tasks (Decision No. 3430- 533/2008/3 of 3 June 2013, as amended)	Dobra laboratorijska praksa / Good Laboratory Practice
Oddelek za varstvo rastlin / Plant Protection Department	DEP (GEP) U3433-11/2016/8	Dobra eksperimentalna praksa / Good Experimental Practices
Poskusni sadovnjak na Brdu pri Lukovici / Experimental Orchard in Brdo pri Lukovici	GLOBAL G.A.P. 00050-TPHFL-0002	Dobra kmetijska praksa / Good Agricultural Practice
Poskusni sadovnjak na Brdu pri Lukovici / Experimental Orchard in Brdo pri Lukovici	"Izbrana kakovost" Slovenija 143-IK-2018 / Selected Quality Slovenia 143-IK-2018	Za pridelavo sadja: jabolka / For fruit production: apples

1.5 Raziskovalni programi in projekti

Research programmes and projects

Raziskovalna dejavnost Kmetijskega inštituta Slovenije je vezana na področja kmetijstva, kmetijske ekologije in varstva okolja. Področja raziskav, ki potekajo na inštitutu se umeščajo v naravoslovne znanosti, biotehniške znanosti, znanosti o življenju in tehniške znanosti.

Glede na način pridobivanja sredstev za raziskave delimo vire v šest sklopov:

- javna služba na področju raziskovalne dejavnosti v obliki raziskovalnih programov,
- temeljni raziskovalni projekti,
- aplikativni raziskovalni projekti,
- ciljni raziskovalni projekti,
- mednarodni projekti ter
- druge raziskovalne naloge in mednarodno sodelovanje.

Obseg javnih služb na področju raziskovalne dejavnosti je za leto 2019 znašal skupaj 7,57 FTE oziroma 516.850 EUR. Javno službo izvajamo v okviru treh raziskovalnih programov: Trajnostno kmetijstvo (šifra ARRS P4-0133), Agrobiodiverziteta (šifra ARRS P4-0072) in Ekonomika agroživilstva in naravnih virov (šifra ARRS P4-0022). Pri slednjem je Kmetijski inštitut Slovenije ena od štirih sodelujočih institucij. Podporo raziskovalnim projektom, projektom temeljnega in aplikativnega raziskovanja, projektom Ciljnega raziskovalnega programa, mednarodnim in drugim projektom pa nudi tudi Infrastrukturni program (šifra ARRS IO-0011).

The research activity of the Agricultural Institute of Slovenia is focused on agriculture, agricultural ecology, and environmental protection. More broadly, the research conducted at the Institute pertains to the natural sciences, biotechnology, life sciences, and technology.

There are six ways in which we fund our research:

- *Public service in the research field in the form of research programmes;*
- *Basic research projects;*
- *Applied research projects;*
- *Targeted research projects;*
- *International projects;*
- *Other research activities and international cooperation.*

Public service in research amounted to 7.57 FTE in 2019 or EUR 516,850. This public service is performed in the framework of three research programmes: Sustainable agriculture (ARRS code P4-0133), Agrobiodiversity (ARRS code P4-0072), and Agrifood and natural resources economics (ARRS code P4-0022); in this last programme the AIS is one of four partner institutions. Support for research projects, basic and applied research, and targeted research projects is also provided by the Infrastructure programme (ARRS code IO-0011).



Tabela: Število projektov na KIS v letih od 2011 do 2019

Table: Number of projects at the AIS in 2011–2019

PODROČJE / DEJAVNOST / AREA / ACTIVITY	2011	2012	2013	2014	2015	2016	2017	2018	2019
Temeljni in aplikativni / Basic and applied projects	11	7	8	8	6	8	2	2	5
Ciljni raziskovalni (CRP) / Targeted research	33	29	18	22	16	28	24	23	21
Mednarodni / International	29	36	28	22	20	22	34	23	54
Mladi raziskovalci / Early stage researchers	11	11	7	6	4	2	4	4	7

V letu 2019 je KIS izvajal skupno 87 projektov od tega kot nosilec 29 raziskovalnih projektov in sicer 3 projekte temeljnega in aplikativnega raziskovanja, 14 projektov ciljnega raziskovalnega programa (CRP) in 12 mednarodnih projektov različnih programov, kot so Obzorje 2020, Interreg, FAO, EFSA, Evropski strukturni skladi. Omeniti je potrebno tudi 7 projektov iz programa »Mladi raziskovalec«, ki je namenjen usposabljanju novih doktorjev znanosti. Podporo pri vključevanju v mednarodne in domače raziskovalne projekte ter pri izvajanju projektov KIS nudi raziskovalcem oddelek Projektna pisarna.

In 2019 the AIS was involved in a total of 87 research projects. It served as the coordinator in 29 projects: three basic and applied research projects, 14 targeted research projects, and 12 international projects in the framework of programmes such as Horizon 2020, Interreg, FAO, EFSA, Evropski strukturni skladi. We should also mention seven projects in the Early stage researcher programme, which is dedicated to training new PhDs. Involvement in international and domestic research projects and carrying out in-house projects is facilitated by the Project Management Office.

1.6 Strokovno delo

Expert work

Poudarek strokovnega dela je na žlahtnjenju kmetijskih rastlin in selekciji rejnih živali, na ohranjanju kmetijskih genskih virov, na varstvu kmetijskih rastlin pred boleznimi in škodljivci, na preskušanju novih kmetijskih praks, na analitiki kmetijskih pridelkov in proizvodov ter na uradnem potrjevanju semenske proizvodnje, semena in sadilnega materiala. V strokovno delo je vključeno tudi sistematično spremljanje razvoja slovenskega kmetijstva. Po naročilu Ministrstva za okolje in prostor izvajamo naloge s področja preprečevanja onesnaževanja voda, kmetovanja na vodovarstvenih območjih in varovanja kmetijskih zemljišč.

Večino strokovnega dela je v letu 2019 potekalo v okviru strokovnih nalog in nalog Javne službe, ki jih financira Ministrstvo za kmetijstvo, gozdarstvo in prehrano.

KIS izvaja naslednje naloge Javne službe na področju kmetijstva:

1. Javna služba strokovnih nalog v proizvodnji kmetijskih rastlin:
 - na področju poljedelstva,
 - na področju vrtnarstva,
 - na področju sadjarstva in
 - na področju vinogradništva.
2. Javna služba strokovnih nalog v živinoreji:
 - na področju govedoreje,
 - na področju prašičereje in
 - na področju čebelarstva.
3. Javna služba nalog rastlinske genske banke Kmetijskega inštituta Slovenije
4. Javna služba zdravstvenega varstva rastlin

The expert work of the AIS focuses on plant breeding and the selection of farmed animals, the preservation of agricultural genetic sources, the protection of agricultural plants from diseases and pests, trialling new agricultural practices, analytics regarding agricultural crops and products, and the official certification of seed production, seeds, and propagation material. Systematic monitoring of the development of Slovenian agriculture is also included in the scope of our expert work. We have been commissioned by the Ministry of the Environment and Spatial Planning to perform tasks associated with the prevention of water pollution, farming in water protection areas, and the protection of farmland.

The bulk of the expert work in 2019 was carried out as part of the expert public service financed by the Ministry of Agriculture, Forestry and Food.

The AIS performs the following public services in agriculture:

1. Public services in the crop-growing segment:
 - Arable farming,
 - Horticulture,
 - Fruit growing, and
 - Viticulture
2. Public services in the livestock production segments:
 - Cattle production,
 - Pig production, and
 - Beekeeping
3. Public services concerning the AIS Plant Gene Bank
4. Public services concerning plant protection

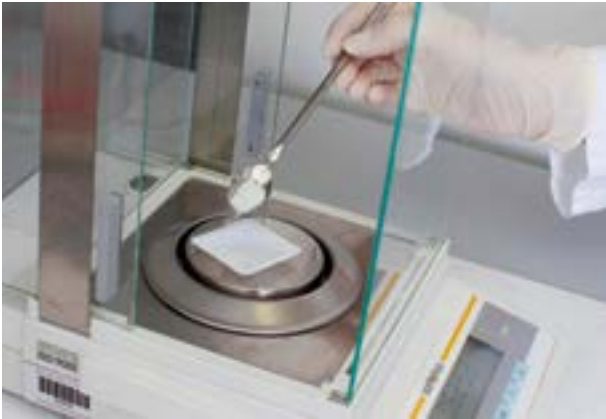


Strokovne naloge, ki jih Kmetijski inštitut Slovenije izvaja po javnem pooblastilu:

1. Strokovne naloge s področja registracije sort rastlin in semenarstva:
 - Uradno potrjevanje semena ter razmnoževalnega in sadilnega materiala kmetijskih rastlin:
 - Uradno potrjevanje semena poljščin in zelenjadnic
 - Uradno potrjevanje razmnoževalnega in sadilnega materiala sadnih rastlin, trte in hmelja
 - Naknadna kontrola kakovosti uradno potrjenega semenskega materiala kmetijskih rastlin in nadzor kakovosti semenskega materiala na trgu:
 - Naknadna kontrola kakovosti uradno potrjenega semenskega materiala kmetijskih rastlin
 - Inšpekcijsko vzeti vzorci semenskega materiala kmetijskih rastlin na trgu
 - Hranjenje uradnih standardnih vzorcev semenskega materiala zavarovanih sort in sort vpisanih v slovensko sortno listo
 - Izvajanje programov preiskav za karantenske škodljive organizme (pri trti in pri semenskem krompirju)

Expert tasks performed by the Agricultural Institute of Slovenia under public authority:

1. Expert tasks concerning the registration of plant varieties and seed production:
 - Official certification of crop seeds and propagation material:
 - Official certification of field crop and vegetable seeds
 - Official certification of the propagation material of fruit plants, vines, and hops
 - Post-control of the quality of officially certified crop seeds and quality control of seeds and propagation material on the market:
 - Post-control of the quality of officially certified crop seeds and propagation material
 - Inspection sampling of crop seeds and propagation material on the market
 - Storage of standard samples of seeds and the propagation material of protected varieties and varieties on the national list of varieties
 - Implementation of investigative programmes regarding quarantine pests (of vines and seed potatoes)



2. Naloge zdravstvenega varstva rastlin:

- Priprava in izvajanje programov preiskav za ugotavljanje navzočnosti škodljivih organizmov rastlin
- Laboratorijske preiskave
- Strokovna podpora UVHVR

3. Druge naloge po javnem pooblastilu:

- Ocenjevanje fitofarmacevtskih sredstev
- Ocenjevanje snovi in biocidnih proizvodov
- Izvajanje laboratorijskih analiz fitofarmacevtskih sredstev
- Izvajanje analiz pedoloških parametrov v okviru izvajanja monitoringa stanja tal
- Izvajanje analiz krme v okviru uradnega nadzora krme
- Izvajanje analiz vina kot pooblaščen organizacija za ocenjevanje mošta, vina in drugih proizvodov iz grozdja in vina
- Izvajanje analiz žganih pijač kot preskusni laboratorij za ugotavljanje skladnosti žganih pijač in drugih alkoholnih pijač

2. Plant health tasks:

- *Preparation and implementation of tests to determine the presence of plant pests*
- *Laboratory tests*
- *Provision of expert support to the Administration of the Republic of Slovenia for Food Safety, Veterinary and Plant Protection*

3. Other tasks under public authority:

- *Assessment of plant protection products*
- *Assessment of substances and biocide products*
- *Laboratory analyses of plant protection products*
- *Analyses of pedological parameters as part of soil monitoring*
- *Feedstuff analyses as part of the official control of feedstuff*
- *Analyses of wine as an authorised organisation for the assessment of must, wine, and other grape and wine products*
- *Analyses of spirits as a test laboratory for establishing the compliance of spirits and other alcoholic beverages*

1.7 Objave

Publications

1.7.1 Pregled objav / *Overview of publications*

Tabela: Pregled pomembnejših objav sodelavcev KIS v letih od 2010 do 2019

Table: Top publications by AIS staff in 2010 – 2019

VRSTA OBJAV / TYPE OF PUBLICATION	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Znanstveni članki / <i>Scientific papers</i>	50	41	49	40	38	53	62	56	43	65
Strokovni in poljudni članki / <i>Articles in peer-reviewed journals and popular-science publications</i>	175	158	180	110	123	124	184	127	144	131
Znanstvene in strokovne monografije / <i>Scientific and professional monographs</i>	16	14	14	1	22	31	27	15	18	18
Strokovne naloge, elaborati / <i>Expert opinions, feasibility studies</i>	37	54	34	32	45	173	195	211	179	148
Prispevki na konferencah / <i>Conference contributions</i>	51	59	68	78	52	73	114	167	111	171
Radijski in TV prispevki, neobjavljeni prispevki na konferencah / <i>Radio and TV contributions, unpublished conference papers</i>	154	270	266	252	241	244	197	220	219	275

1.7.2 Izjemni dosežki

1. Monteiro, Alessandra Nardina Trícia Rigo, Wilfart, Aurélie, Utzeri, Valerio Joe, Batorek Lukač, Nina, Tomažin, Urška, Nanni Costa, Leonardo, Čandek-Potokar, Marjeta, Fontanesi, Luca, Garcia-Launay, Florence. Environmental impacts of pig production systems using European local breeds : the contribution of carbon sequestration and emissions from grazing. *Journal of cleaner production*, ISSN 0959-6526. [Print ed.], 2019, vol. 237, art. no. 117843, str. 1-9

2. Sinkovič, Lovro, Pipan, Barbara, Vasić, Mirjana, Antić, Marina, Todorović, Vida, Ivanovska, Sonja, Creola, Brezeanu, Šuštar Vozlič, Jelka, Meglič, Vladimir. Morpho-agronomic characterisation of Runner bean (*Phaseolus coccineus* L.) from South-eastern Europe. *Sustainability*, ISSN 2071-1050, 2019, vol. 11, art. 6165, str. 1-16

3. Verbič, Janko. V sortno listo Republike Slovenije se kot ohranjevalna sorta vpiše sorta z odobrenim imenom Jabeljska, rastlinska vrsta navadna pasja trava (*Dactylis glomerata* L.), registrska številka sorte DAG011 : Odločba Ministrstva za kmetijstvo, gozdarstvo in prehrano, Uprava Republike Slovenije za varno hrano, veterinarstvo in varstvo rastlin, številka: U34320-58/2013-6 z dne 19.11.2019. Ljubljana, 2019: RS Ministrstvo za kmetijstvo, gozdarstvo in prehrano. 2 str.

4. Verbič, Janko, Lukač, Branko. V sortno listo Republike Slovenije se kot ohranjevalna sorta vpiše sorta z odobrenim imenom Koroški, rastlinska vrsta [navadni lan] (*Linum usitatissimum* L.), registrska številka sorte LIU007 : Odločba Ministrstva za kmetijstvo, gozdarstvo in prehrano, Uprava Republike Slovenije za varno hrano, veterinarstvo in varstvo rastlin, številka: U34320-14/2018-3 z dne 19.11.2019. Ljubljana, 2019: RS Ministrstvo za kmetijstvo, gozdarstvo in prehrano. 2 str.

1.7.2 Exceptional achievements

1. Monteiro, Alessandra Nardina Trícia Rigo, Wilfart, Aurélie, Utzeri, Valerio Joe, Batorek Lukač, Nina, Tomažin, Urška, Nanni Costa, Leonardo, Čandek-Potokar, Marjeta, Fontanesi, Luca, Garcia-Launay, Florence. Environmental impacts of pig production systems using European local breeds : the contribution of carbon sequestration and emissions from grazing. *Journal of cleaner production*, ISSN 0959-6526. [Print ed.], 2019, vol. 237, art. no. 117843, p. 1-9

2. Sinkovič, Lovro, Pipan, Barbara, Vasić, Mirjana, Antić, Marina, Todorović, Vida, Ivanovska, Sonja, Creola, Brezeanu, Šuštar Vozlič, Jelka, Meglič, Vladimir. Morpho-agronomic characterisation of Runner bean (*Phaseolus coccineus* L.) from South-eastern Europe. *Sustainability*, ISSN 2071-1050, 2019, vol. 11, art. 6165, p. 1-16

3. Verbič, Janko. The conservation variety with the approved name Jabeljska of the species orchard grass (*Dactylis glomerata* L.) is entered in the list of varieties of the Republic of Slovenia under variety registration number DAG011: Decision of the Ministry of Agriculture, Forestry and Food, Administration for Food Safety, Veterinary Sector and Plant Protection No. U34320-58/2013-6 of 19 November 2019. Ljubljana, 2019: Ministry of Agriculture, Forestry and Food of the Republic of Slovenia, p. 2.

4. Verbič, Janko, Lukač, Branko. The conservation variety with the approved name Koroški of the species flaxseed (*Linum usitatissimum* L.) is entered in the list of varieties of the Republic of Slovenia under variety registration number LIU007: Decision of the Ministry of Agriculture, Forestry and Food, Administration for Food Safety, Veterinary Sector and Plant Protection No. U34320-14/2018-3 of 19 November 2019. Ljubljana, 2019: Ministry of Agriculture, Forestry and Food of the Republic of Slovenia, p. 2.



5. Dolničar, Peter, Mavrič Pleško, Irena, Sinkovič, Lovro, Simončič, Andrej. V sortno listo Republike Slovenije se vpiše sorta krompirja (*Solanum tuberosum* L.) z odobrenim imenom KIS Razor, registrska številka sorte SOT227 : Odločba Ministrstva za kmetijstvo, gozdarstvo in prehrano, Uprava Republike Slovenije za varno hrano, veterinarstvo in varstvo rastlin, številka: U34320-34/2015-4, z dne 7.6.2019. Ljubljana, 2019: RS Ministrstvo za kmetijstvo, gozdarstvo in prehrano. 2 str.

5. Dolničar, Peter, Mavrič Pleško, Irena, Sinkovič, Lovro, Simončič, Andrej. The variety with the approved name KIS Razor of the species potato (*Solanum tuberosum* L.) is entered in the list of varieties of the Republic of Slovenia under variety registration number SOT227: Decision of the Ministry of Agriculture, Forestry and Food, Administration for Food Safety, Veterinary Sector and Plant Protection No. U34320-34/2015-4 of 7 June 2019. Ljubljana, 2019: Ministry of Agriculture, Forestry and Food of the Republic of Slovenia, p. 2.

1.7.3 Priznanja

Priznanja znanstvenega sveta KIS za leto 2019

Dr. Jaka Razinger in mag. Špela Modic z Oddelka za varstvo rastlin sta prejela priznanje za soizumiteljstvo pri vloženi mednarodni patentni prijavi z naslovom »New bio-pesticides for controlling plant pests« ter za soavtorstvo članka v reviji Scientific Reports, z naslovom »Pore-forming protein complexes from Pleurotus mushrooms kill western corn rootworm and Colorado potato beetle through targeting membrane ceramide phosphoethanolamine«.

1.7.3 Awards

Recognitions awarded by the AIS Scientific Council for 2019

Dr Jaka Razinger and Špela Modic, MSc, from the Plant Protection Department, received a commendation for co-authorship of the international patent application New bio-pesticides for controlling plant pests and co-authorship of the paper Pore-forming protein complexes from Pleurotus mushrooms kill western corn rootworm and Colorado potato beetle through targeting membrane ceramide phosphoethanolamine, published in Scientific Reports.



dr. / Dr Jaka Razinger



mag. / MSc Špela Modic

Dr. Nina Batorek Lukač, dr. Martin Škrlep, dr. Urška Tomažin in dr. Marjeta Čandek-Potokar z Oddelka za živinorejo so kot skupina mlajših raziskovalcev prejeli priznanje za opus devetih znanstvenih člankov, nosilka projekta TREASURE iz programa Obzorje 2020 **dr. Marjeta Čandek-Potokar** pa za pridobitev, koordinacijo, izvedbo ter mednarodno odmevnost projekta.

Priznanje »Odlični v znanosti 2019« Javne agencije za raziskovalno dejavnost Republike Slovenije (ARRS)

V okviru razpisa ARRS za izjemne dosežke na različnih področjih znanosti je bil na področju biotehnike izbran dosežek »Proteinski kompleksi iz glivnega rodu *Pleurotus* kot novi biopesticidi za zatiranje koloradskega in koruznega hrošča«, pri katerem sta sodelovala raziskovalca **dr. Jaka Razinger in mag. Špela Modic** z Oddelka za varstvo rastlin.

Dr Nina Batorek Lukač, Dr Martin Škrlep, Dr Urška Tomažin, and Dr Marjeta Čandek-Potokar, from the Animal Science Department, received a commendation as a group of early stage researchers for a set of nine scientific papers, and the lead partner of the H2020 project TREASURE, **Dr Marjeta Čandek-Potokar**, received a commendation for successfully applying for, coordinating, and implementing the project, together with its international impact.

The Excellent in Science 2019 award presented by the Slovenian Research Agency (ARRS)

The ARRS award for exceptional achievements in the biotechnology field went to Protein complexes from the fungal genus *Pleurotus*, new biopesticides for controlling Colorado potato beetle and western corn rootworm, a project in which **Dr Jaka Razinger and Špela Modic, MSc**, from the Plant Protection Department participated.

Znanstvenik meseca Euphresco

Dr. Saša Širca z Oddelka za varstvo rastlin je bil s strani mreže organizacij Euphresco, ki financirajo raziskovalne projekte in koordinirajo nacionalne raziskave na fitosani-tarnem področju, imenovan za znanstvenika meseca. Dr. Saša Širca deluje na področju diagnostike, epidemiologije, IPM, PRA rastlinsko parazitskih ogorčic ..., med drugim je tudi vodja Euphresco projekta MeloTrop.

Priznanje za inovacijo na mednarodnem sejmu inovacij ARCA

Dr. Viktor Jejčič, predstojnik Oddelka za kmetijsko tehniko in energetiko ter Igor Škrjanec in Edvard Sojer iz podjetja Omega Air d.o.o. so oktobra 2019 sodelovali na mednarodnem sejmu inovacij ARCA v Zagrebu. Za inovacijo »Mikro modularna biometanska naprava za raziskovalno, razvojno in izobraževalno delo« so prejeli srebrno medaljo.

Euphresco Scientist of the Month

Dr Saša Širca from the Plant Protection Department was named Scientist of the Month by Euphresco, a network of organisations that finance research projects and coordinate national plant protection research. Dr Širca works on diagnostics, epidemiology, integrated pest management, pest risk assessment, and plant parasitic nematodes. He is also the leader of the Euphresco project MeloTrop.

Award for innovation at the ARCA International Exhibition of Inventions

Dr Viktor Jejčič, head of the Department of Agricultural Engineering and Energy, and Igor Škerjanec and Edvard Sojer, from the company Omega Air, participated in the International Exhibition of Inventions (ARCA) in Zagreb in October 2019. They received a silver medal for their innovation Micro Modular Biomethane Plant for Research, Development, and Educational Work.

1.7.4 Dejavnost Knjižnice

Specialna knjižnica in INDOK na inštitutu podpira strokovno, raziskovalno ter drugo delo, odprta pa je tudi za zunanje uporabnike.

Dejavnosti knjižnice:

- načrtovana nabava, strokovno obdelovanje, shranjevanje ter posredovanje gradiva s področja kmetijstva,
- posredovanje bibliografskih in informacijskih storitev,
- vodenje osebnih bibliografij raziskovalcev,
- uredniško delo pri inštitutskem repozitoriju, kamor lahko sodelavci odlagajo objave,
- medknjižnična izposoja in
- pomoč pri izdajanju inštitutskih publikacij in posredovanje obveznih izvodov.

1.7.4 Library activity

The specialised library and information and documentation centre supports expert work, research, and other activities at the AIS, and it is also open to outside users.

Library activities:

- Planned purchasing, cataloguing, storage and lending of materials from the agricultural field;
- Provision of library and information services;
- Management of the personal biographies of researchers;
- Editorial work on the Institute's repository, where staff can publish their publications;
- Inter-library loans;
- Assistance in the publication of the Institute's publications and the submission of legal deposits.



V knjižnici KIS obdelujemo gradivo v sistemu COBISS, opravljamo inventarizacijo, katalogizacijo ter vsebinsko obdelavo gradiva, izposojajo knjižničnega gradiva in nudimo pomoč uporabnikom pri iskanju literature. Smo člani konzorcija, ki ga vodi Centralna tehniška knjižnica, v okviru tega imamo dostop do določenega paketa revij Science Direct založbe Elsevier in do paketa elektronskih vsebin SpringerLinka. Pri izboru naročene tuje periodike upoštevamo mnenja raziskovalcev in drugih uporabnikov knjižnice.

V letu 2019 smo skladno s sklepom Znanstvenega sveta KIS in zaradi izpolnjevanja določil Evropske komisije glede odprte dostopnosti recenziranih znanstvenih objav in raziskovalnih podatkov, ki so rezultat z javnimi sredstvi financiranih projektov kakor tudi zahtev slovenske nacionalne strategije, pričeli z oddajo znanstvenih del v Digitalni repozitorij raziskovalnih organizacij Slovenije – DIRROS. DIRROS je enotna vstopna točka za odlaganje in dostop do elektronskih oblik znanstvenih in strokovnih del, poročil, raziskovalnih podatkov ter drugega gradiva, ki nastaja v raziskovalnih organizacijah.

The AIS library processes materials in the COBISS system, inventories, catalogues, and conducts substantive analyses of the materials, lends library materials, and provides assistance to users searching for materials. As a member of a consortium headed by the Central Technical Library, AIS has access to a package of Science Direct journals published by Elsevier and a package of electronic content published by SpringerLink. In deciding on subscriptions to foreign journals, we consider the opinions of researchers and other users of the library.

In 2019 we started to submit scientific contributions to the Digital Repository of Slovenian Research Organizations (DIRROS), which complies with a resolution of the AIS Scientific Council, European Commission requirements regarding open access to peer-reviewed scientific publications and research data resulting from projects financed with public funds, and the requirements set out in the Slovenian national strategy in this field. DIRROS is a single point of entry for the submission of and access to electronic versions of scientific and professional papers, reports, research data, and other materials created by research organisations.

1.8 Inovacijska dejavnost

Innovation activity

Za namen spodbujanja krepitev povezav in sodelovanja Kmetijskega inštituta Slovenije z gospodarstvom ter upravljanja in širjenja znanja o intelektualni lastnini med raziskovalci deluje na KIS oddelek Pisarna za prenos tehnologij in znanja. Pisarna nudi raziskovalcem pravno podporo pri sklepanju pogodb z gospodarstvom in postopkih zaščite intelektualne lastnine, pomaga raziskovalcem pri pogajanjih z deležniki iz zasebnega sektorja in trženju ter promociji znanja. Pisarna sodeluje s Komisijo za inovacije KIS, ki je svetovalni organ direktorja pri razvoju inovacijske politike KIS. Od leta 2017 KIS sodeluje kot partner v projektu »Konzorcij za prenos tehnologij iz javnih raziskovalnih organizacij (JRO) v gospodarstvo«.

V letu 2019 je KIS skupaj z Univerzo v Ljubljani (Fakulteta za strojništvo) na Evropskem patentnem uradu prijavil patent s popolnim preizkusom za skupno inovacijo. Inovacije in razvojne dosežke smo predstavljali na kmetijsko-živilskem sejmu AGRA v Gornji Radgoni, na spomladanskem in jesenskem kmetijskem sejmu v Komendi ter na sejmu Ecomondo v Italiji. Udeležili smo se razstave Future Food na Gospodarski zbornici Slovenije in mednarodne razstave inovacij ARCA v Zagrebu.

In order to promote the strengthening of ties and cooperation with business, as well as the management and dissemination of intellectual property know-how among researchers, the Agricultural Institute of Slovenia established a Technology Transfer Office. The Office provides legal assistance in contracting with businesses and intellectual property protection procedures. It helps researchers engage in negotiations with private-sector stakeholders and commercialise and promote know-how. The Office cooperates with the AIS Innovation Commission, an advisory body to the Director in the development of the AIS's innovation policy. Since 2017 the AIS has been a partner in the Consortium for technology transfer from public research organisations to industry.

In 2019, the AIS and the University of Ljubljana (Faculty of Mechanical Engineering) submitted to the European Patent Office a patent application for a substantive examination of a joint invention. Inventions and development achievements were presented at the agri-food fair AGRA in Gornja Radgona, the spring and autumn agricultural fairs in Komenda, and at the Ecomondo fair in Italy. We participated in the Future Food exhibition at the Chamber of Commerce and Industry of Slovenia and the ARCA International Exhibition of Inventions in Zagreb.

1.9

Pedagoške aktivnosti

Teaching

V študijskem letu 2018/2019 oziroma v letu 2019 je bilo 18 sodelavcev inštituta vključenih v pedagoški proces od višje do magistrske stopnje študija na slovenskih izobraževalnih institucijah.

In the academic year 2018/2019, a total of 18 AIS staff members were involved in teaching undergraduate or master's degree courses at Slovenian educational institutions.

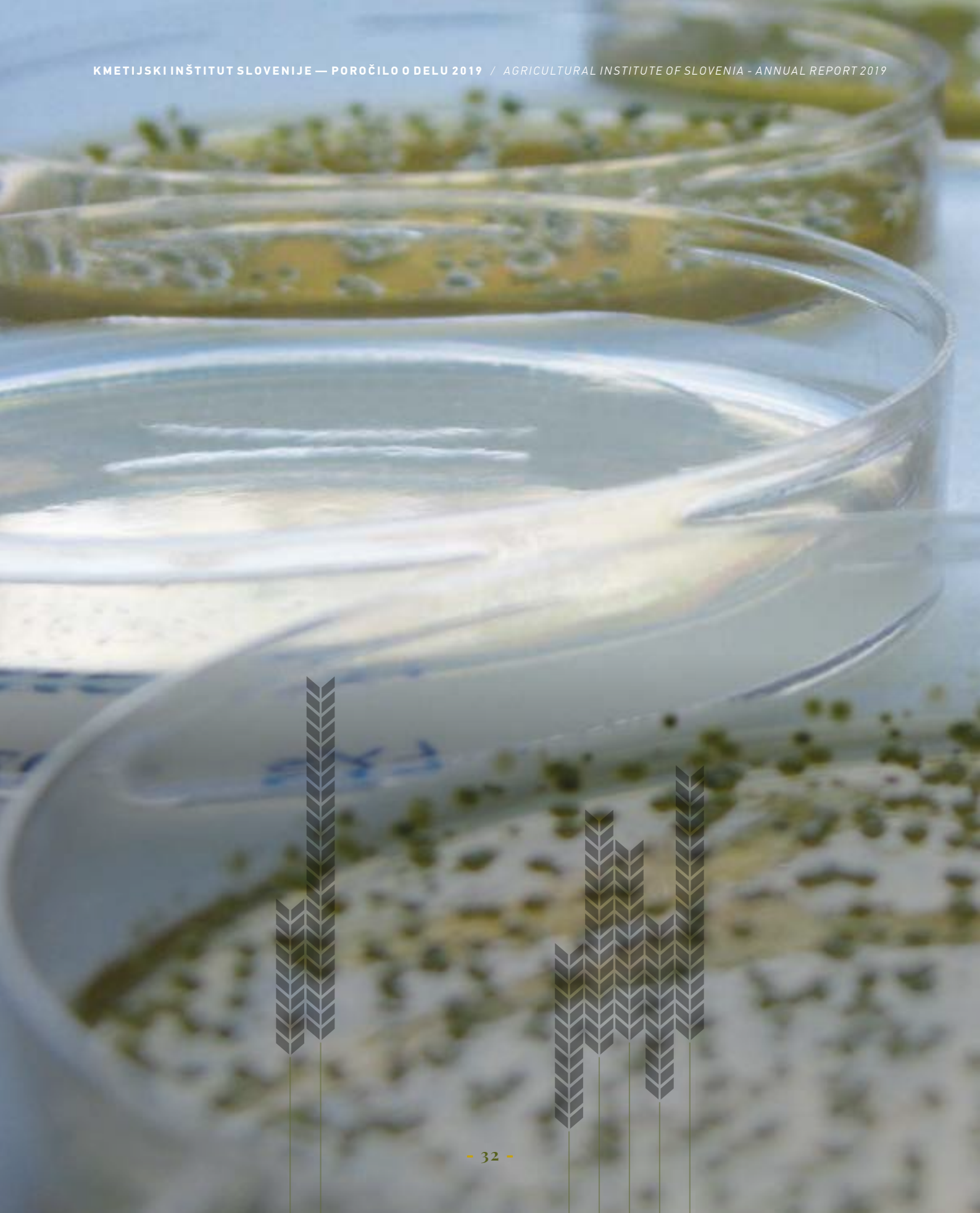
Tabela: Sodelavci KIS, vključeni v pedagoški proces v letu 2019

Table: AIS staff involved in the educational process in 2019

ORGANIZACIJA / ORGANISATION		PREDMET / COURSE
dr. / Dr Dejan Bavčar	Biotehniški izobraževalni center (BIC) / Biotechnical Educational Centre	Tehnologija vina / Wine technology
dr. / Dr Drago Babnik	Univerza v Ljubljani, Biotehniška fakulteta / University of Ljubljana, Biotechnical Faculty	Znanost o krmi / Feed science
doc. dr. / Assist. Prof. Dr Nina Batorek Lukač	Univerza v Mariboru, Fakulteta za kmetijstvo in biosistemske vede / University of Maribor, Faculty of Agriculture and Life Sciences	Fiziologija z anatomijo domačih živali (vaje), Fiziologija domačih živali (vaje) / Physiology and anatomy of domestic animals (laboratory practicals); Physiology of domestic animals (laboratory practicals)
doc. dr. / Assist. Prof. Dr Nika Cvelbar Weber	Univerza v Mariboru, Fakulteta za kmetijstvo in biosistemske vede / University of Maribor, Faculty of Agriculture and Life Sciences	Integrirana pridelava zelenjave (vaje), Zelenjadarstvo (vaje) / Integrated vegetable production (laboratory practicals); Vegetable cultivation (laboratory practicals)
izr. prof. dr. / Assoc. Prof. Dr Marjeta Čandek-Potokar	Univerza v Mariboru, Fakulteta za kmetijstvo in biosistemske vede / University of Maribor, Faculty of Agriculture and Life Sciences	Kakovost živalskih produktov in predelava mesa, Tehnologije predelave živalskih produktov / Quality of animal products and meat processing Technologies for the processing of animal products
dr. / Dr Peter Dolničar	Univerza v Ljubljani, Biotehniška fakulteta / University of Ljubljana, Biotechnical Faculty	Poljedelstvo (terenske vaje), Genetika in žlahtnjenje (terenske vaje) / Arable farming (field work); Genetics and plant breeding (field work)
dr. / Dr Janez Jeretina	Univerza v Mariboru, Fakulteta za kmetijstvo in biosistemske vede / University of Maribor, Faculty of Agriculture and Life Sciences	Tehnologije predelave živalskih produktov: Predelava mleka in mesa / Technologies for the processing of animal products: milk and meat processing
doc. dr. / Assist. Prof. Dr Klemen Lisjak	Univerza v Novi Gorici, Visoka šola za vinogradništvo in vinarstvo / University of Nova Gorica, School of Viticulture and Enology	Sodobne tehnike pri pridelavi vina / Modern trends in winemaking

	ORGANIZACIJA / ORGANISATION	PREDMET / COURSE
mag. / MSc Tomaž Poje	Univerza v Novi Gorici, Visoka šola za vinogradništvo in vinarstvo / University of Nova Gorica, School of Viticulture and Enology	Stroji in oprema v kleti in vinogradu / Vineyard and winery equipment
	Univerza na Primorskem, Fakulteta za matematiko, naravoslovje in informacijske tehnologije / University of Primorska, Faculty of Mathematics, Natural Sciences and Information Technologies,	Osnove varstva rastlin / Principles of plant protection,
izr. prof. dr. / Assoc. Prof. Dr Andrej Simončič	Univerza v Mariboru, Fakulteta za kmetijstvo in biosistemske vede / University of Maribor, Faculty of Agriculture and Life Sciences,	Ekologija v fitomedicini in ekologija pesticidov / Ecology in phytomedicine and pesticide ecology,
	Visoka šola za varstvo okolja, Velenje / Environmental Protection College, Velenje,	Vplivi kmetijstva na okolje / Environmental impact of agriculture,
	Univerza v Ljubljani, Biotehniška fakulteta / University of Ljubljana, Biotechnical Faculty	Varstvo rastlin (sodelujoči profesor) / Plant protection (participating professor)
Janez Sušin, univ. dipl. inž. agr. / B.Sc. (Agr.)	Visoka šola za varstvo okolja, Velenje / Environmental Protection College, Velenje	Vplivi kmetijstva na okolje (sodelujoči predavatelj) / Environmental impact of agriculture (participating lecturer)
doc. dr. / Assist. Prof. Dr Martin Škrlep	Univerza v Mariboru, Fakulteta za kmetijstvo in biosistemske vede / University of Maribor, Faculty of Agriculture and Life Sciences	Fiziologija z anatomijo domačih živali / Physiology and anatomy of domestic animals
doc. dr. / Assist. Prof. Dr Katja Šuklje Antalick	Univerza v Novi Gorici, Visoka šola za vinogradništvo in vinarstvo / University of Nova Gorica, School of Viticulture and Enology	Osnove vinogradništva, Vinogradništvo / Principles of viticulture, Viticulture
izr. prof. dr. / Assoc. Prof. Dr Jelka Šuštar Vozlič	Visoka šola za varstvo okolja, Velenje / Environmental Protection College, Velenje	Vplivi kmetijstva na okolje (sodelujoča predavateljica) / Environmental impact of agriculture (participating lecturer)
izr. prof. dr. / Assoc. Prof. Dr Andreja Vanzo	Univerza v Novi Gorici, Visoka šola za vinogradništvo in vinarstvo / University of Nova Gorica, School of Viticulture and Enology	Sekundarni metaboliti grozdja in vina / Grapevine secondary metabolites
dr. / Dr Jože Verbič	Univerza v Ljubljani, Biotehniška fakulteta / University of Ljubljana, Biotechnical Faculty	Osnove prehrane, Pridelovanje in konzerviranje krme, Znanost o krmi, Travišstvo in pridelovanje krme / Basic nutrition; Feed production and conservation; Feed science; Grassland and forage crops production
	Visoka šola za varstvo okolja, Velenje / Environmental Protection College, Velenje	Vplivi kmetijstva na okolje (sodelujoči predavatelj) / Environmental impact of agriculture (participating lecturer)
Janko Verbič, univ. dipl. inž. agr. / B.Sc. (Agr.)	Univerza v Ljubljani, Biotehniška fakulteta / University of Ljubljana, Biotechnical Faculty	Travišstvo in pridelovanje krme (terenske vaje), Poljedelstvo (terenske vaje) / Grassland and forage crops production (field work); Arable farming (field work)
izr. prof. dr. / Assoc. Prof. Dr Borut Vrščaj	Visoka šola za varstvo okolja, Velenje / Environmental Protection College, Velenje	Raba in varstvo tal / Soil use and protection





Raziskovalno in strokovno delo ter storitvena dejavnost v oddelkih

*Research, expert work, and
services by department*

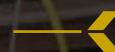
Raziskovalno in strokovno delo ter izvajanje storitev potekajo na Kmetijskem inštitutu Slovenije v okviru desetih oddelkov. Podporo pri izvajanju aktivnosti jim nudijo Skupne službe ter v letu 2018 ustanovljena oddelka Projektna pisarna ter Pisarna za prenos tehnologij in znanja. Na KIS deluje tudi samostojna Služba za uradno potrjevanje semenskega in sadilnega materiala kmetijskih rastlin.



Research, expert work, and services are performed at the AIS across ten departments, which are supported by the Joint Services division and, since their establishment in 2018, the Project Management Office and the Technology Transfer Office. The AIS also has an independent Service for Official Certification of Seed and Plant Propagation Material of Agricultural Plants.

2

Oddelek za
poljedelstvo,
vrtnarstvo,
genetiko in
žlahtnjenje



*Crop Science
Department*

Predstojnik / Head of department
dr. / Dr Peter Dolničar

Raziskovalno delo na oddelku poteka na področjih raziskav rastlinskih genskih virov, genetike, žlahtnjenja kmetijskih rastlin, fiziologije rastlin ter konvencionalnih in ekoloških načinov pridelovanja in dodelave poljščin, krmnih rastlin in vrtnin. Strokovno delo obsega predvsem področja žlahtnjenja novih sort poljščin, krmnih rastlin in vrtnin, genske banke ter preskušanja in rajonizacije novih sort kmetijskih rastlin. Strokovne naloge s teh področij, ki jih izvajamo za Ministrstvo za kmetijstvo, gozdarstvo in prehrano (MKGP), imajo značaj javne službe. Na oddelku je na voljo ustrezna raziskovalna infrastruktura (genetski laboratorij in laboratorij za fiziologijo in tkivne kulture ter rastlinjak), medtem ko so preskusna polja del Infrastrukturnega centra Jablje.

Research conducted by this department spans plant genetic resources, genetics, crop breeding, plant physiology, and conventional and organic methods for the production and processing of field crops, fodder plants, and vegetables. The expert work focuses primarily on the breeding of new varieties of field and fodder crops and vegetables, the gene bank, and the testing of new plant varieties across Slovenia. The expert activities in these fields, carried out for the Ministry of Agriculture, Forestry and Food, are performed as a public service. The department has appropriate research infrastructure (laboratories for genetics, tissue culture and plant physiology, a greenhouse), while the experimental fields are part of the Jablje Infrastructure Centre.

RAZISKOVALNO DELO

- Preučevanje raznolikosti genskih virov stročnic, trav, razhudnikovk, križnic, lilijevk in košaric in drugih kmetijskih rastlin
- Multidisciplinarno raziskavo s področij rastlinske genetike in žlahtnjenja, fiziologije rastlin, interakcij rastlin s patogeni in prenašalci bolezni in tehnologij pridelave kmetijskih rastlin
- Vpeljava pristopov sistemske biologije za povezavo bazičnih raziskav odziva rastlin na stres
- Preučevanje tehnologij pridelovanja in dodelave v konvencionalnih in ekoloških pridelovalnih sistemih
- Raziskave na področju trajnostnih tehnologij pridelave

RESEARCH

- Research of the diversity of the genetic resources of legumes, grasses, nightshades, crucifers, lilies, asters, and other plant species
- Multidisciplinary research in plant genetics and breeding, plant physiology, the interaction of plants with pathogens and disease vectors, and crop-growing technologies
- The introduction of systems biology approaches to integrate basic research on plant stress responses
- The studies of production and processing technologies in conventional and organic production systems
- Research on sustainable production technologies

STROKOVNO DELO IN STORITVE

Strokovno delo

- Javna služba nalog rastlinske genske banke pri KIS
- Javna služba za področje poljedelstva (posebno preskušanje sort poljščin, preskušanje tehnologij pridelovanja, žlahtnjenje kmetijskih rastlin – krompir, ajda, krmne rastline)
- Javna služba za področje vrtnarstva (posebno preskušanje sort zelenjadnic, preskušanje tehnologij pridelovanja, žlahtnjenje fižola)
- Strokovne naloge s področja registracije sort rastlin in semenarstva

Storitve

- Preizkušanje sortne pristnosti in čistosti ter druge analize s področja genetike
- Svetovanje pridelovalcem (telefonsko, osebno in na terenu)
- Organizacija strokovnih srečanj

Expert work

Expert work

- Public service of the Plant Gene Bank at AIS
- Public services in arable farming (testing of field crop varieties, testing of crop production technologies, crop breeding - potato, buckwheat, fodder plants)
- Public services in horticulture (testing of vegetable varieties, testing of crop production technologies, bean breeding)
- Expert tasks in the field of registration of plant varieties and seed science

Services

- Testing of varietal identity and purity, other genetic analyses
- Advisory services for farmers (by telephone, in person, or in the field)
- Organisation of expert meetings

Vzgoja zdravega česna slovenskih sort v *in vitro* kulturah na KIS
In vitro cultivation of healthy Slovenian varieties of garlic at AIS



2019

V okviru programske skupine Agrobiodiverziteta je delo potekalo interdisciplinarno na področju rastlinske genetike ter žlahtnjenja, fiziologije rastlin, interakcij rastlin s patogeni in prenašalci bolezni ter tehnologij pridelave kmetijskih rastlin. Raziskave v rastlinski genetiki so bile usmerjene k uspešni identifikaciji funkcionalnih in gensko vezanih markerjev za agronomske in prehranske lastnosti v izbranih kmetijskih rastlinah, z uporabo uveljavljenih molekularnih pristopov in najnovejših genetskih orodij ter DNA-markerjev. Z namenom bolje razumevati mehanizme rastlinske odpornosti na abiotiki (suša) in biotski (škodljivci) stres na fiziološkem, biokemijskem ter molekularnem nivoju smo preučevali profile izražanja genov, spremembe v količini proteinov in spremembe v aktivnosti metabolitov, pogojene s stresom. V primeru navadnega fižola in krompirja smo nadaljevali z uporabo genetskih markerjev, bodisi za genetsko kartiranje bodisi kot podporo v žlahtnjenju. Pripravili smo članek, v katerem smo predlagali novo genetsko karto fižola za lastnosti, povezane s sušnim stresom. Na botanično pestrem travinju smo v okviru raziskav na področju trajnostnih tehnologij želeli ugotoviti krmno vrednost in pridelovalni potencial posameznih vrst trav, metuljnic in zeli trajnega travinja ter ugotoviti, kako na njihovo krmno vrednost vpliva čas košnje.

2019

In the framework of the Agrobiodiversity Programme, interdisciplinary work was carried out in plant genetics and breeding, plant physiology, the interaction of plants with pathogens and disease vectors, and crop production technologies. Plant genetics research was focused on the successful identification of functional and genetically linked markers for the agronomic and dietary properties of selected crops, using established molecular approaches as well as the latest genetic tools and DNA markers. To better understand the mechanisms of plant resilience to abiotic (drought) and biotic (pests) stress at the physiological, biochemical, and molecular level, we studied stress-related gene expression profiles, changes in the quantity of proteins, and changes in the activity of metabolites. In common beans and potatoes, we continued using genetic markers either for gene mapping or as breeding support. The work resulted in a paper in which we proposed a new genetic map of common beans for properties associated with drought stress. We conducted sustainable technology studies of botanically diverse grasses in order to determine the fodder value and production potential of selected types of grasses, legumes, and herbs in permanent grassland, and to evaluate how mowing time affects fodder value.



Ajda ima pomembno mesto v ekološki pridelavi,
preučujemo jo v projektu Ecobreed
*Buckweed has an important place in organic agriculture,
we study it in Ecobreed project*

V letu 2019 smo nadaljevali delo na projektu H2020 ECOBREED, kjer je Kmetijski inštitut Slovenije vodilni partner projekta. Temeljni cilj projekta ECOBREED je oblikovati prilagojeni setveni sortiment za ekološko pridelavo štirih pomembnih kmetijskih kultur, in sicer pšenice, krompirja, soje in ajde. V projektu bodo v nadaljnjih petih letih razvite selekcijske metode in infrastruktura za ekološko pridelavo semen, ki imajo izboljšano odpornost na stres, so kakovostnejše in učinkovitejše. Projekt ECOBREED je s strani Evropske komisije (DG AGRI in DG SANTE) identificiran kot strateško pomemben projekt za doseganje ciljev, navedenih v Uredbi (EU) 2018/848 Evropskega parlamenta in Sveta o ekološki pridelavi in označevanju ekoloških proizvodov, ki bo stopila v veljavo 1. januarja 2021.

V projektu MedVitis smo nadaljevali z ampelografskimi meritvami in genetskimi analizami na izbranih genskih virih iz rodu *Vitis*, ki smo jih identificirali v letu pred tem.

V okviru projekta CRP V4-1806 je potekala vzpostavitev sistema uporabe DNA markerjev za genetsko identifikacijo pri preverjanju sortne pristnosti in čistosti pomembnejših vrst žit in križnic kot osnova za kakovostno pridelavo semenskih posevkov ter varno in kakovostno pridelano hrano in krmo.

In 2019 we continued work on the H2020 project ECOBREED, of which the Agricultural Institute of Slovenia is the coordinator. The underlying aim of ECOBREED is to create an adapted variety collection for the organic production of four major crops: wheat, potato, soy, and buckwheat. Over the next five years, the project will involve the development of selection methods and infrastructure for the organic production of seeds that are more resistant to stress, have better quality, and are more efficient. ECOBREED has been identified by the European Commission (DG AGRI and DG SANTE) as a strategically important project for achieving the aims listed in Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 on organic production and labelling of organic products, which will enter into effect on 1 January 2021.

In the project MedVitis, we continued with ampelographic measurements and genetic analyses of selected genetic resources of the genus Vitis, which had been identified the previous year.

The targeted research project (Ciljni raziskovalni projekt; xsystem for using DNA markers for the genetic identification and verification of the varietal identity and purity of important cereal and cruciferous species as a basis for high-quality seed production and safe and quality production of food and feedstuff.

Trajni poskus na naravnem travinju v Rožicah -
del Javne službe v poljedelstvu

*Long term experiment on natural grassland in Rožice -
as a part of Public services in arable farming*



V letu 2019 smo pri nalogi Registracija sort rastlin in semenarstvo izvajali preizkušanje sort v postopku vpisa sort v sortno listo (preskušanje VPU), hranjenje uradnih standardnih vzorcev, naknadno kontrolo poljščin in vrtnin ter preverjanje vzdrževanja sort za obnovo vpisa in pogojev za vpis vrtničarskih in ohranjevalnih sort. V VPU preizkušanje je bilo vključenih 84 sort poljščin.

Namen Javne službe nalog rastlinske genske banke (JSRGB-KIS) je dolgoročno ohranjanje rastlinskih genskih virov in zagotavljanje njihove trajnostne uporabe na strokoven, enovit in učinkovit način. Vanjo so vključene zbirke genskih virov krmnih rastlin, krompirja, vrtnin, hmelja, jagodičja in vinske trte. Poleg tega KIS sodeluje kot podizvajalec pri JSRGB-BF pri programu zbirke žit.

Regarding the registration of plant varieties and seed science, we conducted testing of varieties undergoing registration in the Variety list (VCU testing), preservation of official standard samples, carried out subsequent control of field crops and vegetables, and verified the maintenance selection of varieties for renewal of registration and the conditions for the registration of gardening and conservation varieties. A total of 84 crop varieties underwent VCU testing.

The purpose of the Plant Gene Bank as public service is the long-term preservation of plant genetic resources and ensuring that they are sustainably used in a professional, uniform, and efficient manner. The gene bank houses collections of genetic resources of fodder plants, potato, vegetables, hops, berries, and grapevine. The AIS also acts as subcontractor for the cereals collection of the Biotechnical Faculty's plant seed bank.



Žlahtnjenje krompirja na KIS ima dolgoletno tradicijo – saditev na opeko in križanja novih sort v Jabljah
Potato breeding has a long tradition at AIS - planting on brick and crossing of new varieties in Jablje

Leto 2019 je bilo drugo leto izvajanja programa Javnih služb s področja poljedelstva in vrtnarstva, ki zajema:

- žlahtnjenje izbranih poljščin in vrtnin;
Pri žlahtnjenju je bil dosežen največji napredek pri krompirju. Križanec KIS 09-184/233-1 je bil v prvem letu v registraciji v preskušanju VPU in RIN, KIS 07-136/164-11 je nadaljeval VPU preskušanje v drugem letu, KIS 07-194/94-1 je bil v preskušanju RIN. Križanec KIS 05-204/191-2 je uspešno končal preskušanje in je bil potrjen v novo sorto KIS Razor. Pri žlahtnjenju fižola smo v preskušanje RIN poslali dve bodoči sorti KIS Silverij in KIS Amand.
- introdukcijo poljščin in vrtnin ter in ugotavljanje njihove vrednosti za predelavo;
V letu 2019 smo v Jabljah, Rakičanu, Novem mestu, Mariboru, Ajdovščini ter v Biljah preskušali 60 hibridov koruze, 67 sort strnih žit, 33 krmnih rastlin, 23 zrnatih stročnic, 40 sort krompirja, 11 sort cvetače, 11 sort fižola in 9 hibridnih sort melon.
- tehnologije pridelave (pri vsaki JS je bilo preskušanih po 7 novih tehnologij) in
- strokovno-tehnično koordinacijo.

2019 was the second year the AIS performed public services concerning arable farming and horticulture, which includes:

- *The breeding of selected field crops and vegetables;
In the area of breeding, we have made the most headway with potato. The advanced clone KIS 09-184/233-1 underwent VCU and DUS testing in the first year after registration, KIS 07-136/164-11 continued VCU testing in its second year, and KIS 07-194/94-1 underwent DUS testing. The advanced clone KIS 05-204/191-2 successfully completed testing and was registered as the new variety KIS Razor. At bean breeding two new potential varieties KIS Silverij and KIS Amand were sent to DUS testing.*
- *The introduction of field crops and vegetables and identification of their production value:
In 2019 we tested 60 maize hybrids, 67 varieties of cereal crops, 33 fodder plants, 23 pulses, 40 varieties of potato, 11 varieties of cauliflower, 11 varieties of beans, 9 hybrid varieties of melon.*
- *Production technologies (for each public service, seven new technologies were tested);*
- *Professional and technical coordination.*

Infrastrukturni center Jablje



Jablje Infrastructure Centre

Predstojnik / Head of department
dr. / Dr Blaž Germšek

V letu 2019 sta Infrastrukturni center Jablje sestavljali dve enoti: Center za raziskave in poskusništvo in Center za prenos tehnologij. Center za raziskave in poskusništvo oskrbuje 50 ha poskusnih polj, namenjenih znanstveno-raziskovalnemu in strokovnemu delu. Večina od 420 ha polj, ki jih obdeluje Center za prenos tehnologij, je namenjenih tržni in semenski pridelavi poljščin, del pa je namenjen demonstracijam prenosa novih strokovnih spoznanj in tehnologij v prakso.

The Jablje Infrastructure Centre comprises two units, the Centre for Research and Trials and the Centre for Technology Transfer. The Centre for Research and Trials manages 50 ha of experimental fields dedicated to scientific research and expert work. The 420 ha of fields managed by the Centre for Technology Transfer is set aside for commercial crops and seed production; some of the land is used to demonstrate the transfer of new know-how and technologies into practice.

RAZISKOVALNO IN STROKOVNO DELO

- Skrbimo za Mednarodni trajni poskus z organskim dušikom IOSDV (poljščine in krmne rastline) v Jabljah in Rakičanu
- Sodelujemo pri žlahtnjenju krompirja in izbranih vrst poljščin, zelenjadnic ter krmnih rastlin ter izvajamo vzdrževalno selekcijo sort kmetijskih rastlin
- Oskrbujemo poskuse po programih strokovnih nalog s področja varstva in registracije sort rastlin ter semenarstva in posebnega preizkušanja sort za opisno sortno listo
- Nudimo podporo z delom, poskusnimi polji in infrastrukturo vsem oddelkom pri izvajanju javnih služb, poskusov in raziskavam v kmetijstvu

RESEARCH AND EXPERT WORK

- Management of the International Organic Nitrogen Fertilization LongTerm Experiment IOSDV (field crops and fodder plants) in Jablje and Rakičan
- Involvement in the breeding of potato and selected field crops, vegetables and fodder plants, maintenance selection of crop varieties.
- Supply of trials in the framework of expert tasks concerning the protection and registration of plant varieties, seed science experiments, and special trials for the descriptor list of varieties.
- Provision of support in the form of labour, experimental fields, and infrastructure to all departments in the performance of public services, trials, and agricultural research

STORITVE

- Prenašamo nova strokovna spoznanja s področij tehnologije pridelave kmetijskih rastlin, semenarstva, živinoreje, varstva rastlin in kmetijske tehnike v kmetijsko prakso
- Pridelujemo in prodajamo seme slovenskih sort trav, detelj, žit in krompirja ter kakovostna krušna in krmna žita ter druge sorte trav in detelj, primerne za slovenska polja
- Izvajamo neodvisne makroposkuse žit in koroze
- Preskušamo nove tehnologije s področja preciznega poljedelstva (precizni nanos umetnih gnojil)
- Organiziramo strokovne in izobraževalne dogodke

SERVICES

- Transfer of new know-how on crop production technologies, seed science, livestock farming, plant protection, and agricultural techniques into agricultural practice
- Production and sale of the seeds of Slovenian varieties of grasses, clover, cereals, and potato, and high-quality cereals of bread-making quality, fodder cereals and other varieties of grasses and clover
- Independent macro-trials of cereals and maize
- Trials of new precision-agriculture technologies (precise application of artificial fertiliser)
- Organisation of expert and educational events



Poskus solat v Infrastrukturnem centru Jablje
Salad trials at Jablje Infrastructure Centre



Pobiranje poskusov krompirja
Potato trial harvesting

2019

Na Infrastrukturnem centru Jablje smo uspešno zaključili investicijo v izgradnjo več vrtin primarnega in sekundarnega cevovoda za namakalni sistem, ki bo služil za namakanje 79 ha kmetijskih površin. Od leta 2019 se osredotočamo na preskušanje novih in novejših tehnologij za zmanjševanje stroškov pridelave in večjo ekonomsko in okoljsko učinkovitost določenih delovnih procesov, tako v poljedelstvu kot v vrtnarstvu. Z letom 2019 smo pričeli tržno pridelovati seme avtohtone sorte solate tolminka in dveh obujenih sort fižola (Lišček in Češnjevec).

2019

The Jablje Infrastructure Centre successfully completed an investment into the construction of multiple primary and secondary wells for an irrigation system that will irrigate 79 ha of agricultural land. Since 2019 we have focused on trialling the latest technologies to reduce production costs and improve the economic and environmental efficiency of certain work processes, in crop production as well as in horticulture. We commenced commercial production of the seeds of the native lettuce variety Tolminka and two revived bean varieties (Lišček and Češnjevec).

Oddelek za živinorejo



*Animal
Science
Department*

Predstojnik / Head of department
dr. / Dr Drago Babnik

Delo Oddelka za živinorejo je usmerjeno pretežno na področje govedoreje, prašičereje in čebelarstva. Vsebinski poudarek je na kakovosti živalskih proizvodov, varovanju okolja, izboljševanju dobrobiti živali, prilagajanju živinoreje klimatskim spremembam, gospodarni rabi naravnih virov, trajnostnih vidikih, konkurenčnosti in genetskem napredku živinoreje ter razvoju spletnih orodij za podporo vodenja čred na kmetijah.

Infrastrukturno podporo raziskovalnemu in razvojnemu delu nudijo v okviru oddelka tudi raziskovalni laboratoriji: Laboratorij za prehrano živali, Laboratorij za kakovost mesa, Laboratorij za NIR spektroskopijo, Čebelarški laboratorij in Poskusni center za čebelarstvo v Seničnem, z mrežo opazovalnih postaj. Oddelek vodi tudi nacionalno Centralno podatkovno zbirko Govedo.

The work of the Animal Science Department primarily focuses on cattle production, pig production, and beekeeping. Main research topics are the quality of animal products, protection of the environment, improvement of animal welfare, the adaptation of animal production to climate change, the efficient use of natural resources, sustainability and competitiveness of animal production and genetic progress, and the development of online tools in support of farm management.

Infrastructure support for research and development work is additionally provided by the department's research laboratories: the Animal Nutrition Laboratory, the Meat Quality Laboratory, the Laboratory for NIR Spectroscopy, the Bee Laboratory, and the Experimental Centre for Apiculture in Senično with its network of monitoring stations. The department also manages the national Central Cattle Database (CPZ Govedo).

RAZISKOVALNO DELO

Na področju govedoreje

- Interakcija genotip okolje
- Vročinski stres pri molznicah
- Klavna kakovost in kakovost mesa
- Dolgoživost krav
- Napovedovanje plemenskih vrednosti
- Genomska selekcija
- Odkrivanje bolezni vimena in presnovnih motenj na podlagi sestave mleka
- Tehnološka in prehranska kakovost mleka

Na področju prašičereje

- Raziskovanje fenotipske in genetske variabilnosti kompleksnih lastnosti kot so pitovne in klavne lastnosti ter kakovost mesa
- Razumevanje bioloških procesov in fizioloških mehanizmov povezanih s kakovostjo mesa
- Preučevanje vplivov različnih sistemov reje, prehrane, pasem, ravnanja z živalmi, ter pogoji predelave na kakovost mesa in mesnih izdelkov in sicer s fiziološkega, kemijskega, proteomskega ter genetskega vidika
- Oblikovanje bolj trajnostnih sistemov pri reji prašičev

RESEARCH

Cattle production

- Genotype-environment interaction
- Heat stress in dairy cows
- Slaughter and meat quality
- Cow longevity
- Estimation of breeding values
- Genomic selection
- Detection of udder diseases and metabolic disorders based on milk composition
- The technological and dietary quality of milk

Pig production

- Research on the phenotypic and genetic variability of complex traits, such as fattening, slaughter properties and meat quality
- Understanding biological processes and physiological mechanisms associated with meat quality
- Investigation of the effects of different breeding systems, nutrition, genotype, animal handling and processing conditions on the quality of meat and meat products from the physiological, chemical, proteomic and genetic point of view
- The creation of more sustainable pig production systems

RAZISKOVALNO DELO

Na področju čebelarstva

- Tehnologije čebelarjenja
- Prehrana čebel in vplivi okolja na čebelje družine
- Razpoložljivost prehranskih virov in nosilnost okolja
- Naravna odpornost čebel in različni načini zatiranja varoj
- Molekularne raziskave
- Čebele kot netačni organizmi

Na področju prehrane prežvekovalcev in krme

- Preučevanje kakovosti voluminozne krme, s poudarkom na izkoriščanju energije in beljakovin ter gospodarni rabi lokalnih virov
- Proučevanje krmnih rastlin, prilagojenih sušnim razmeram, pa tudi krme, ki so jo prizadele neugodne vremenske razmere, kot so suša, toča in poplave
- Posodabljanje priporočil za krmljenje in razvijanje metod ocenjevanja krme
- Načini in postopki konzerviranja voluminozne krme

RESEARCH

Beekeeping

- Beekeeping technologies
- Bee nutrition and effects of environmental factors on bee colonies
- The availability of food sources and carrying capacity
- The natural resilience of bees and different types of Varroa destructor control procedures
- Molecular research
- Bees as non-target organisms

Ruminant diet and feedstuffs

- Forage quality research with an emphasis on the utilisation of energy and protein and the efficient use of local resources
- Research of forage/fed plants adapted to drought conditions and feedstuff affected by unfavourable weather conditions such as drought, hail, and flooding
- Updating of the feeding recommendations and the development of feed evaluation methods
- Methods and procedures for the forage preservation

STROKOVNO DELO

Na področju govedoreje

- Vzdrževanje in razvijanje informacijskega sistema ter vodenja nacionalne Centralne podatkovne zbirke Govedo
- Kontrola prireje mleka in mesa
- Zbiranje podatkov za potrebe vodenja rodovnika, selekcije in plodnosti
- Priprava podatkov za napoved plemenskih vrednosti
- Vodenje rodovniških knjig za posamezne pasme in izdaja zootehniških dokumentov

Na področju prašičereje

- V okviru skupnega temeljnega rejskega programa se ugotavlja proizvodne sposobnosti (meritve klavnih lastnosti in tehnološke kakovosti mesa)
- Razvoj metod za ocenjevanje mesnatosti prašičev na klavni liniji
- Problematika, povezana z uvedbo alternativ kirurške kastracije, rejo lokalnih pasem in kakovostjo mesnih izdelkov
- Razvijanje novih metod analitike mesa

Na področju čebelarstva

- Vodenje, koordinacija in izvajanje selekcije kranjske čebele
- Analiza morfoloških lastnosti čebel in molekularni genski testi
- Izvajanje progenega testiranja matic
- Vodenje Izvorne rodovniške knjige za kranjsko čebelo
- Sodelovanje s Čebelarsko zvezo Slovenije

Ostala področja

- Urejanje nacionalnih evidenc toplogrednih plinov in različnih onesnaževalnih dejavnikov zraka
- Spremljanje bilance dušika in fosforja na nacionalni ravni

EXPERT WORK

Cattle production

- Maintenance and development of the information system; management of the national Central Cattle Database
- Milk and meat recording
- Collection of data for herd books, selection, and fertility
- Estimation of breeding value
- Management of herd books for individual breeds and issuance of herd book entry certificates

Pig production

- In the framework of the core breeding programme, we determine the production capacity (measurement of slaughter properties and the technological quality of meat)
- Development of methods for assessing the profile of pigs on the slaughter line
- Issues concerning the introduction of alternatives to surgical castration, the breeding of local breeds, and the quality of meat products
- Development of new methods of meat analytics

Beekeeping

- Management, coordination, and execution of Carniolan honeybee selection
- Analysis of the morphological traits of bees and molecular genetic tests
- Progeny testing of queen bees
- Management of the Original Herd-Book of Carniolan bee *Apis mellifera carnica*
- Collaboration with the Slovenian Beekeeping Association

Other

- Management of national records of greenhouse gasses and different air pollutants
- Monitoring of nitrogen and phosphorous balance at the national level



NIR analizatorja, namenjena hitremu in točnemu ocenjevanju sestave rastlinskih in živalskih vzorcev
NIR analysers intended for fast and accurate estimation of plant and animal sample composition

STORITVE

- Strokovna podpora rejcem pri rejskem delu
- NIRS-analize in ocenjevanje hranilne vrednosti krme
- Ocenjevanje klavnih lastnosti ter kakovosti mesa prašičev
- Molekularne analize za preverjanje porekla in odkrivanje genetskih napak pri govedu
- Analize medu v sodelovanju s CL (kemijske in senzorične analize)
- Osemenjevanje čebeljih matic
- Razvoj in vzdrževanje spletnih orodij za podporo vodenja čred na kmetijah, nacionalne Centralne podatkovne zbirke Govedo (CPZ Govedo), spletnega programa za računanje obrokov (KOKRA/KOPIT) in spletnega programa za laboratorije (LabKIS)

SERVICES

- Expert support to producers in production activities
- NIRS analyses and evaluation of the nutritional value of feedstuff
- Evaluation of the slaughter properties of pigs and of pork quality
- Molecular analysis for parentage verification and detection of genetic defects
- Honey analysis in cooperation with the Central Laboratories (chemical and sensory analysis)
- Insemination of queen bees
- Development and maintenance of tools supporting farm management, the Central Cattle Database (CPZ Govedo), a web application for calculating rations (KOKRA/KOPIT), and the web application for laboratories (LabKIS)

2019

V sklopu projekta H2020 TREASURE smo objavili rezultate raziskav, izvedenih na krškopoljskem prašiču, ki prikazujejo vpliv sistema reje (konvencionalni in ekološki) na kakovost mesa in mesnih izdelkov (salame). Rezultati kažejo vpliv na maščobno-kislinsko sestavo, kakovost mesa ter posledično biokemične, reološke ter senzorične lastnosti izdelkov. S pomočjo modeliranja smo ocenili rast in prehranske potrebe pri devetih avtohtonih pasmah prašičev, med drugim tudi krškopoljskega prašiča. Sisteme rej krškopoljskega prašiča smo ovrednotili tudi z okoljskega vidika. Omenjena pasma je bila skupaj z 20-imi drugimi

2019

In the framework of the H2020 project TREASURE, we published the results of studies on the Krškopolje pig that demonstrated the impact of the production system (conventional and organic) on the quality of meat and meat products (salami). It was shown that the production system affects the fatty acids composition, meat quality, and, consequently, the biochemical, rheological, and sensory properties of products. Using modelling, we assessed the growth and dietary requirements of nine autochthonous pig breeds, including the Krškopolje pig. Krškopolje pig production systems were also evaluated from the environmental point of view. Together with 20 other



Krškopoljski prašiči v prosti reji
Krškopolje pigs in free range system

evropskimi lokalnimi pasmami vključena v genetsko karakterizacijo (testiranje na posamezne genske markerje, 70 K SNP-čip ter sekvenciranje celotnega genoma), kjer smo preučevali genomsko diverziteto in populacijsko strukturo, zadnji del genetskih raziskav pa je vključeval identifikacijo genomskih regij, povezanih s fenotipsko diferenciacijo. V sklopu projekta smo izdali knjigo »European local pig breeds – Diversity and performance«, kjer so predstavljeni opis, produktivnost ter lastnosti kakovosti mesa dvajsetih evropskih avtohtonih pasem.

Preučevali smo vpliv spola (kastrati v primerjavi s svinjkami) in časa soljenja na kakovost pršutov in ugotovili povečan obseg proteolize in poslabšanje reoloških lastnosti pri manj slaninih pršutih ter pršutih, proizvedenih iz stegen svinjk. Vpliv kategorije spola prašičev na kakovost trupa, mesa in sestavo maščobe smo (v sklopu projekta ERA NET SuSI) preučevali tudi na primerjavi merjascev, imunokastratov in kirurških kastratov. Lastnosti kakovosti in sestave smo povezali tudi z biokemičnimi parametri (tj. aktivnost encimov lipogeneze, oksidacija), histološkimi analizami, miofibrilarno fragmentacijo ter diferencialnim izražanjem genov v mišičnem in maščobnem tkivu.



Spremljanje izgub pri pršutih v poskusu tekom zorenja
Monitoring of processing losses in experimental hams

European local breeds, the Krškopolje breed was included in genetic characterisation (testing for individual gene markers, 70 K SNP array, and the sequencing of the entire genome), where we studied genomic diversity and population structure; the final part of the genetic testing involved identification of the genome associated with phenotypic differentiation. In the frame of the project TREASURE we published the book *European Local Pig Breeds – Diversity and Performance*, in which the morphological description, productivity, and meat quality traits of twenty European autochthonous pig breeds and presented.

We examined the impact of sex (castrates compared to gilts) and salting time on the quality of dry-cured hams and found increased proteolysis and deterioration of rheological properties in less salty dry-cured hams and in those originating from gilts. The impact of pig sex on the quality of the carcass, meat, and fat composition was also studied (in the framework of the ERA NET SuSI project) by comparing entire male, immunocastrated pigs, and surgically castrated pigs. The quality and composition traits were associated with biochemical parameters (i.e. the activity of lipogenetics enzymes, oxidation), histological analyses, myofibrillar fragmentation, and differential gene expression in muscle and fat tissue.

Spremljanje sestave in energijske vrednosti
krme med sušenjem v valjastih balah
*Monitoring of forage composition and energy value
during drying in round bales*



Raziskovali smo vpliv načina uporabe genomske informacije ter optimizacije prispevkov pri odbiru očetov v rejskem programu za govedo. Ugotovili smo, da lahko genetski napredek povečamo z genomsko selekcijo, večjo intenzivnostjo selekcije in hitrejšo menjavo očetov. Prav tako smo ugotovili, da hitrejša menjava očetov in hibridna uporaba progeno in genomsko testiranih očetov omogočata največjo učinkovitost pretvorbe genetske variabilnosti v genetski napredek in s tem trajnostno selekcijo. Dokazali smo tudi, da lahko učinkovitost pretvorbe dodatno povečamo z optimizacijo prispevkov očetov.

Raziskovali smo povezave genetskih vplivov na somatske celice v mleku pri govedu rjave pasme. Z analizo vpliva polimorfizmov posameznih nukleotidov (SNP) na indeks presežka somatskih celic za krave rjave pasme smo dokazali vpliv nekaterih SNP označevalcev na kazalnike subkliničnega mastitisa. Ti lokusi lahko služijo kot močni kandidati za uporabo v selekcijskih programih goveda za učinkovitejšo odbiro živali, ki imajo želen genotip za večjo odpornost na subklinične mastitise.

V sodelovanju z raziskovalci Biotehniške fakultete Univerze v Ljubljani smo izdelali napovedne enačbe za oceno pridelka, vsebnosti surovih beljakovin, vsebnosti presnovljive energije in vsebnosti neto energije za laktacijo na podlagi srednje razvojne faze ali starosti mnogocvetne ljujke ob košnji ter pripravili priporočila za optimalen čas košnje.

We studied the impact of using genomic information in dairy breeding programmes and the optimisation of sire contributions. We determined that genetic gain increases with the use of genomic selection, higher selection intensity and a faster turn-over of the sires. We achieved the highest efficiency of converting genetic variance into genetic gain with a faster turn-over of sires and a hybrid use of progeny and genomically tested. We also showed that the efficiency of conversion can be additionally increased with the optimization of genetic contributions of sires.

Another area of study concerns the genetic impact on somatic cells in milk in brown breed cattle. By analysing the impact of single nucleotide polymorphisms (SNPs) on somatic cell count index in brown breeds, we demonstrated the impact of certain SNP markers on indicators of subclinical mastitis. These loci may serve as strong candidates for use in cattle selection programmes for the most effective selection of animals with the desired genotype for greater resistance to subclinical mastitis.

In collaboration with researchers from the University of Ljubljana's Biotechnical Faculty, we created estimating equations for the assessment of yield, the content of raw protein, the content of metabolisable energy, and the content of net energy per lactation based on median developmental phase or the age of Italian ryegrass at harvest, and issued recommendations regarding the optimal harvest time.



Voščeni lončki za matične celice
Wax queen cups

V sodelovanju z raziskovalci iz Francije in Slovaške smo na podlagi številnih lastnosti mleka iz različnih okolij in različnih načinov reje (osnovne sestavine, karotenoidi, maščobne kisline, minerali, derivati fenolnih spojin, hlapne organske spojine, barva) ugotovili, da se gorsko mleko razlikuje od nižinskega predvsem zaradi različnih načinov krmljenja molznic in da ima poreklo (nadmorska višina) pri tem manjšo vlogo.

Pripravili in objavili smo podrobno analizo emisij toplogrednih plinov v slovenski govedoreji. Pripravili smo pregled možnosti za njihovo zmanjšanje in pregled obstoječih ukrepov, ovrednotili smo njihov učinek in pripravili priporočila za njihovo izboljšanje.

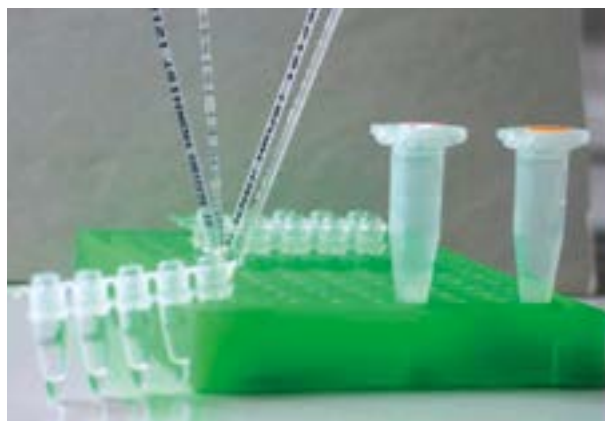
Preučevali smo nosilnost okolja v času čebeljih paš. Ugotovili smo odvisnost med količino naravnih virov in pridelavo medu. Nadalje smo ugotovili omejenost donosa z gostoto čebeljih družin na enoto vira medenja. In tretjič, matematično definicijo odnosa med gostoto čebeljih družin in donosom je moč uporabiti kot vodilo za postavitev zgornje meje čebeljih družin na lokaciji.

In collaboration with researchers from France and Slovakia, we analysed numerous properties of milk from different environments and a variety of production systems (basic ingredients, carotenoids, fatty acids, minerals, derivatives of phenol compounds, volatile organic compounds, colour) and determined that the milking method is the principal source of differences between mountain milk and lowland milk; origin (altitude) has a smaller impact.

We prepared and published a detailed analysis of greenhouse gas emissions in Slovenian cattle production, including an overview of potential ways to reduce emissions, an evaluation of existing measures, and recommendations for improvements.

Carrying capacity was studied during bee foraging. We determined that there is a correlation between the quantity of natural resources and honey production. We also found that yield is limited by the density of bee colonies per unit of foraging area. The mathematically defined relationship between the density of bee colonies and yield can be used as guidance in setting an upper limit on the number of bee colonies at a specific location.

Priprava vzorca za genetske analize
Sample preparation for genetic analysis



Kakovost matice je pomembna za čebeljo družino. Večina parametrov kakovosti, ki jih uporabljajo čebelarji in vzrejevalci čebeljih matic, je povezana s telesno maso matic, ki se kaže kot robustna mera za kakovost. Z metodo strojnega učenja smo izluščili tehnološke in biološke parametre, ki pri vzreji matic vplivajo na maso. V podporo čebelarjem in vzrejevalcem matic smo podali smernice za njihovo pro-tržno selekcijo.

Za namene genotipizacije in vpeljave molekulskih označevalcev v selekcijo (marker-assisted selection) pri kranjski čebeli smo razvili neinvaziven način vzorčenja, ki omogoča neposredno genotipizacijo matic brez vpliva na dolgoživost. V vedenjskem poskusu smo vzorčili posamezne delavke iz družin z različno izraženo čistilno sposobnostjo, ki so izvajale določena vedenja (odpiranje celic s poškodovano zalego, zapiranje celic z nepoškodovano zalego, nehigiensko vedenje). Te delavke smo nadalje vključili v poizkus diferencialnega izražanja genov in genotipizacijo. S tarčnim sekvenciranjem naslednje generacije smo določili genetska zaporedja v izbranih regijah na genomu, povezanih z izražanjem odpornosti na varojo v družini in pripravili testni nabor SNP za genotipizacijo matic pri vzrejevalcih v Sloveniji.

Queen bee quality is important for the colony. The majority of quality parameters used by beekeepers and breeders of queen bees are associated with the body mass of queen bees, which has become a robust proxy for quality. Using machine learning, we extracted the technological and biological parameters that affect queen bee mass during breeding. We issued guidelines for market-oriented selection to assist beekeepers and queen bee breeders.

For the purposes of genotyping and marker-assisted selection of the Carniolan honeybee, we developed a non-invasive sampling method that allows direct genotyping without having an impact on longevity. In a behavioural experiment we sampled individual worker bees from colonies with different hygienic behaviour that engaged in certain behaviours (the opening of cells with damaged brood, the capping of cells with undamaged brood, unhygienic behaviour). These worker bees were further analysed through differential gene expression and genotyping. With targeted next generation sequencing we determined the genetic sequences in selected regions of the genome that are associated with the expression of resistance to Varroa destructor, and prepared a test SNP array for genotyping queen bees in breeding operations in Slovenia.

Oddelek za sadjarstvo, vinogradništvo in vinarstvo



*Department of
Fruit Growing,
Viticulture, and
Oenology*

Predstojnik / Head of department
dr. / Dr Franc Čuš

Na Oddelku za sadjarstvo, vinogradništvo in vinarstvo se ukvarjamo s strokovnim in raziskovalnim delom ter tržno dejavnostjo. Smo nosilci številnih nalog v okviru javne službe (JS). Pri sadjarstvu to predstavlja koordinacijo JS ter delo na področju izbora sort ter tehnoloških poskusov za jagodičje, jabolano in kaki. Pri vinogradništvu smo nosilci oz. sodelujemo pri izvajanju javne službe za introdukcijo in tehnološke poskuse na vinski trti ter selekciji domačih klonov številnih sort vinske trte. Projektno delo s področij sadjarstva, vinogradništva in vinarstva je vezano na izboljšanje tehnologij pridelave sadja in vinskega grozdja ter vina kot tudi prilagajanja kmetijske pridelave na spremenjene klimatske razmere.

The Department of Fruit Growing, Viticulture, and Oenology performs research, expert work, and commercial services. It plays a leading role in many of the Institute's public services: it coordinates public services in the selection of varieties and technological trials for berries, apples, and persimmon; and in viticulture it is either the leader of or participates in the introduction and technological trials of grapevine and the selection of domestic clones of many varieties of grapevine. Project-based work in fruit growing, viticulture, and oenology concerns improvements in fruit, wine grapes, and wine production technologies and the adaptation of agricultural production to the changing climate.

RAZISKOVALNO DELO

Področje vinogradništva in vinarstva

- Vinogradniška in vinarska tehnologija
- Ostanki pesticidov v vinu
- Preučevanje vidikov zdravstvenih učinkov uživanja vina
- Trajnostna pridelava vinskega grozdja
- Merjenje vsebnosti aromatičnih in polifenolnih spojin, glutationa ter negativnih spojin v vinu
- Izbor starterskih kultur kvasovk za alkoholno fermentacijo

Področje pečkarjev in jagodičja

- Regulacija rodne nastavka pri pečkarjih, sonaravne metode gojenja in varstva
- Preverjanje potenciala pridelave domačih jablanovih sort
- Preučevanje vpliva talnih razmer na pridelavo jagodičja
- Vpliv gnojenja na skladiščno sposobnost jagod in borovnic ter vsebnost aromatičnih spojin
- Karakterizacija naravnih arom jabolk, jagod in ameriških borovnic
- Preučevanje fizioloških procesov, povezanih s cvetenjem, delovanje rastnih regulatorjev
- Razvoj novih tehnik nanosa FFS, ekološka pridelava sadja in trajnostni načini vnosa hranil v tla

RESEARCH

Viticulture and oenology

- Viticulture and oenology technology
- Pesticide residue in wine
- The health effects of wine consumption
- The sustainable production of wine grapes
- Measurements of the content of aromatic and polyphenol compounds, glutathione, and negative compounds in wine
- Selection of yeast starter cultures for alcoholic fermentation

Pome fruits and berries

- Regulation of the fruiting potential in pome fruits; close-to-nature production and protection methods
- Research on potentials regarding the production of domestic apple varieties
- Research on the impact of soil conditions on berry production
- The impact of fertilisation on the storage capacity of strawberries and bilberries and the content of aromatic compounds
- Characterisation of the natural aromas in apples, strawberries and blueberries
- Research on physiological processes associated with flowering and on growth regulators
- Development of new techniques for the application of plant protection products, organic fruit production, and sustainable techniques for introducing nutrients into soil

STROKOVNO DELO	EXPERT WORK
- Javna služba za sadjarstvo - preizkušanje sort za vpis v sadni izbor za jabolano, jagodičje in kaki - Javna služba za sadjarstvo - koordinacija JS - Javna služba za vinogradništvo - preizkušanje sort za vpis v trsni izbor za vinsko trto ter selekcija novih klonov sort vinske trte v našem trsnem izboru - Javna služba genska banka za jagodičje in vinsko trto - Ampelografsko in tehnološko vrednotenje starih, lokalno razširjenih sort vinske trte - Vzdrževanje podatkovne baze izotopskih razmerij za slovenska vina z geografskim poreklom	- Public service tasks concerning fruit growing: variety trials for entry in the fruit variety list for apple, berries, and persimmon - Public service tasks concerning fruit growing: coordination of public services - Public service tasks concerning viticulture: trials of varieties for entry in the grapevine variety list and the selection of new clones of grapevine varieties for the grapevine selection register - The gene bank for berries and grapevine (public service) - Ampelographic and technological evaluation of old, locally present grapevine varieties - Maintenance of a database of isotope ratios for Slovenian wines with a protected designation of origin
STORITVE	SERVICES
- Strokovno in raziskovalno delo za zunanje naročnike (podjetja, javni sektor) - Izvajanje analiz grozdja in vina	- Expert and research work for external clients (companies, the public sector) - Analysis of grapes and wine

2019

V letu 2019 je bilo na Oddelku za sadjarstvo, vinogradništvo in vinarstvo zaposlenih 18 sodelavcev: 10 doktorjev znanosti, trije univerzitetno diplomirani inženirji in pet tehničnih sodelavcev. S koncem leta so štirje tehnični sodelavci iz sadovnjaka Brdo pri Lukovici prešli pod IC Jابلje.

V letu 2019 smo na oddelku izvajali naslednje nacionalne projekte, katerih nosilci (sklopov) smo:

- Izboljšanje kakovosti slovenskih belih vin z boljšo ekspresijo sortnih arom (aplikativen ARRS projekt)
- Vpliv težkih kovin na staranje belih vin (aplikativen ARRS projekt)
- Tehnologije za konkurenčnejšo pridelavo jabolka (CRP projekt)
- Ogroženost lokalnih sort zaradi genske erozije in njihova vrednost za pridelavo in uporabo (CRP projekt)
- Funkcionalna živila prihodnosti – F4F Delovni sklop RRP4: Karakterizacija naravnih arom (projekt strategije pametne specializacije)

2019

The Department of Fruit Growing, Viticulture, and Oenology had 18 employees in 2019: ten PhDs, three with a bachelor's degree, and five technical staff. At the end of the year, four members of the technical staff at the Brdo pri Lukovici orchard were formally reassigned to the Jابلje Infrastructure Centre.

In 2019, the following national projects were carried out by the department as leading partner or WP leader:

- Improvement of the quality of Slovenian white wines with better expression of varietal aromas (applied ARRS project)*
- The impact of heavy metals on the ageing of white wines (applied ARRS project)*
- Technologies for more competitive production of apples (CRP project)*
- The risk of genetic erosion in local varieties and their production and utilisation value (CRP project)*
- Functional foods of the future – F4F, work package RRP4: Characterisation of natural aromas (a Smart Specialisation Strategy project)*

Merjenje fotosintetske aktivnosti na listih jabolane
Measurement of photosynthetic activity on apple leaves



- Program usposabljanja dveh mladih raziskovalk s področja vinarstva
- Program spodbujanja raziskovalcev na začetku kariere 2.0 in 2.1 za dve mladi doktorici s področja sadjarstva

Raziskovalno delo smo opravljali tudi v okviru programske skupine Trajnostno kmetijstvo.

V letu 2019 smo na oddelku izvajali tudi naslednje mednarodne projekte, katerih nosilci (sklopov) smo:

- Agrotur II – Trajnostni razvoj kmetijstva in turizma na čezmejnem Krasu (Interreg SLO-ITA)
- Enotour - Inovativno partnerstvo za razvoj vinogradništva in enoturizma spodnje Vipavske doline (LAS projekt)
- LUIGI - Linking Urban and Inner-Alpine Green Infrastructure - Multifunctional Ecosystem Services for more liveable territories (Interreg Alpine Space)

- *Oenological training of two early stage researchers*
- *Programme for the promotion of early-career researchers 2.0 and 2.1 for two young PhDs in fruit growing*

Additional research work was also conducted in the framework of the programme group Sustainable Agriculture.

The department carried out the following international projects in 2019 as leading partner or WP leader:

- *Agrotur II – Cross-border sustainable development of agriculture and tourism in the Karst Plateau (Interreg Slovenia-Italy)*
- *Enotour – Innovative partnership for the development of viticulture and oenotourism in the Lower Vipava Valley (Local Action Group project)*
- *LUIGI – Linking urban and inner-Alpine green infrastructure – Multifunctional ecosystem services for more liveable territories (Interreg Alpine Space)*



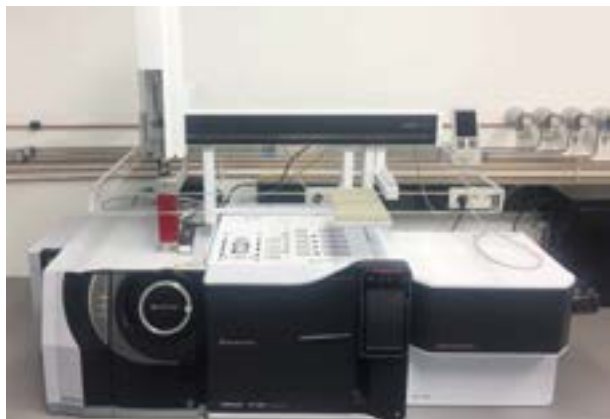
Spremljanje vpliva skladiščenja na kakovost jagod
v pogojih kontrolirane atmosfere
*Studying the influence of different storage conditions
on the quality of strawberry fruit*

V letu 2019 smo bili izredno uspešni pri pridobivanju novih projektov in sredstev znotraj javne službe ter iz tržne dejavnosti. Tako smo načrtovane prihodke presegle za skoraj 20 %. S tržno dejavnostjo smo realizirali dobre 3 % prihodkov. Nekatera od tržnih sodelovanj imajo tudi veliko posrednih učinkov, in sicer preko ustvarjanja pozitivnega ugleda inštituta v javnosti (sodelovanje z Ljubljanskim gradom). Dobro delo v okviru javnih služb se je odrazilo v manjšem povečanju sredstev za izvajanje javne službe v letu 2020 ter sredstev za investicije.

V letu 2019 smo pridobili dva nova aplikativna ARRS projekta (pri enem smo nosilci pri drugem soizvajalci), skupaj z Oddelkom za varstvo rastlin en CRP projekt, en mednarodni projekt (Horizon 2020 – projekt Excalibur (skupaj z OVR)) ter pet EIP oz. pilotnih projektov (Trajnostna pridelava jabolk, Sadjarji za opraševanje, Ekološka pridelava sadja, Travniški sadovnjaki, Tehnološka posodobitev pridelave grozdja in vina za cviček PTP). Kadrovsko smo se okrepili za dve novi sodelavki, doktorici znanosti.

In 2019 we were very successful in securing new projects and funds in the framework of both public service and commercial activities. Planned revenue was thus exceeded by almost 20% and commercial activities generated over 3% of total revenue. Some of the commercial partnerships have had significant knock-on effects by creating a positive public image of the Institute (e.g. collaboration with Ljubljana Castle). The good work in the public service segment was reflected in a moderate increase in public service funding for 2020 and in investment funding.

We secured two new applied ARRS projects (one of which we are coordinating and another in which we are partners), one new CRP project together with the Plant Protection Department, one international project (the Horizon 2020 project Excalibur (together with the Plant Protection Department)) and five EIP or pilot projects (Sustainable apple production, Fruit growers and pollination, Organic production of fruit, Traditional orchards, Technological upgrade of grape and wine processing for Cviček (recognised traditional denomination)). As regards staff, we hired two new PhDs.



Plinski kromatograf z masnim spektrometrom (GC-MS/MS) in SCD detektorjem za žveplove spojine

Triple-quad GCMS with sulfur chemiluminescence detection system



Poskusna mikroviniifikacijska klet

Experimental microvinification cellar

Še vedno zelo dobro sodelujemo s Centralnim laboratorijem in sicer pri vzdrževanju in nabavi raziskovalne opreme ter delitve zaposlenih med oba oddelka.

Oddelak je tudi bogatejši za tri kose laboratorijske opreme za pripravo vzorcev, ki smo jih nabavili v okviru Paketa 17 (liofilizator, avtomatski ekstraktor in evaporator) ter nove stroje v mikroviniifikacijski kleti (etiketirka, polnilnica, zapiralec za plutovinaste zamaške ter ploščni filter in črpalka).

V letu 2019 smo tudi validirali SPME-GC-MS metodo za določanje vsebnosti 14 aromatičnih snovi v jagodičju. Objavili smo 13 znanstvenih člankov v revijah s faktorjem vpliva. Na oddelku smo v preteklem letu prav tako uspešno vzdrževali sistem kakovosti po standardu ISO 9001:2015 ter v manjši meri sodelovali s Centralnim laboratorijem pri vzdrževanju sistema kakovosti po standardu ISO 17025.

We continue to successfully collaborate with the Central Laboratories in the maintenance and acquisition of research equipment and in the sharing of staff.

The department has also acquired three pieces of laboratory equipment for the preparation of samples, which were purchased as part of Package 17 (a freeze drier, an automatic extractor, and an evaporator) and new devices for the micro vinification cellar (a labeller, a bottler, a corking machine, a plate filter, and a pump).

We validated the SPME-GC-MS method for identifying the presence of 14 aromatic compounds in berries. 13 scientific papers were published in journals with an impact factor. The department successfully maintained the ISO 9001:2015 quality system and collaborated with the Central Laboratories in maintaining the ISO 17025 quality system.

Oddelek za varstvo rastlin



*Plant Protection
Department*

Predstojnik / Head of department
dr. / Dr Gregor Urek

Aktivnosti Oddelka za varstvo rastlin se nanašajo na spremljanje zdravstvenega stanja rastlin in na preučevanje ter obvladovanje karantenskih ter gospodarsko pomembnih škodljivih organizmov. Delo poteka v petih diagnostičnih laboratorijih (nematološki, mikološki, bakteriološki, virološki, entomološki) in v laboratoriju za hiperspektralne analize. Veliko opazovanj in poskusov opravimo na terenu, del raziskav pa tudi v sodobnem rastlinjaku.

The activities of the Plant Protection Department focus on monitoring plant health, and preventing and managing quarantine pests and pests of economic importance. The work is carried out at five diagnostic laboratories (nematology, mycology, bacteriology, virology, and entomology) and the Hyperspectral Analysis Laboratory. Many observations are carried out in the field; a portion of the research is also performed in a state-of-the-art greenhouse.

RAZISKOVALNO DELO

- Razvoj in uvajanje novih laboratorijskih metod za diagnostiko škodljivih organizmov
- Sodelovanje pri razvoju in uporabi novih tehnik na področju molekularne filogenije in taksonomije
- Preučevanje raznolikosti in ekologije škodljivih in koristnih organizmov
- Preučevanje vpliva podnebnih sprememb na biologijo in epidemiologijo škodljivih organizmov
- Razvoj metod z nizkim tveganjem za obvladovanje škodljivih organizmov
- Interakcije med patogeni, prenašalci in gostiteljskimi rastlinami ter patogeni in mikroorganizmi
- Preučevanje možnosti obvladovanja invazivnih rastlinskih vrst
- Preizkušanje odpornosti bolezni in škodljivcev na FFS
- Daljinsko zaznavanje – uvajanje multi- in hiperspektralnih analiz za ugotavljanje pojavnosti škodljivih organizmov v prostoru in kot neinvazivne tehnike detekcije pojava bolezni

RESEARCH

- Development and deployment of new laboratory methods for pest diagnostics
- Collaboration in the development and use of new techniques in molecular phylogeny and taxonomy
- Research on the diversity and ecology of pests and beneficial organisms
- Research on the impact of climate change on pest biology and epidemiology
- Development of low-risk methods of pest management
- Interactions between pathogens, disease vectors, and host plants, and between pathogens and microorganisms
- Research into possible ways of managing invasive plant species
- Testing resistance of plant pathogens to plant protection products
- Remote sensing – the introduction of multispectral and hyperspectral analyses for detecting pests in the environment as a non-invasive technique for disease detection

STROKOVNO DELO IN STORITVE

Strokovno delo

- Naloge zdravstvenega varstva rastlin po javnem pooblastilu (izvajanje programov posebnih preiskav za karantenske škodljive organizme, laboratorijske preiskave, strokovna podpora UVHVVR)
- Javna služba zdravstvenega varstva rastlin (opazovalno napovedovalna služba, integrirano varstvo rastlin)

Storitve

- Preskušanje biološke učinkovitosti fitofarmacevtskih pripravkov za zunanje naročnike
- Svetovanje (telefonsko, osebno in na terenu pri pridelovalcih)
- Organizacija različnih strokovnih srečanj

EXPERT WORK AND SERVICES

Expert work

- Plant health tasks under public authority (programmes for the special investigation of quarantine pests, laboratory tests, and providing expert support to the Administration of the Republic of Slovenia for Food Safety, Veterinary and Plant Protection)
- Plant health public services (forecasting and warning services, integrated plant protection)

Services

- Testing of the biological efficacy of plant protection products for external clients
- Advisory services (by telephone, personally, in the field)
- Organisation of expert meetings



Razvoj metod z nizkim tveganjem za obvladovanje škodljivih organizmov kot del integriranega varstva rastlin

Development of low-risk methods of pest management as a part of integrated plant protection

2019

V okviru aktivnosti oddelka, ki se nanašajo na iskanje okolju prijaznih načinov varstva rastlin, usmerjenih v zmanjševanje tveganja zaradi rabe fitofarmaceutskih pripravkov, smo sodelovali na projektih, ki obravnavajo uporabo metod z nizkim tveganjem (V4-1602, V4-1802), izkoriščanje multifunkcionalne talne biodiverzitete v hortikulturi (Excalibur), izkoriščanje biodiverzitete v vinogradniških sistemih z namenom zmanjševanja škod in uporabe pesticidov ter povečanja ekosistemskih uslug (BioVine), integrirano obvladovanje plevelov (IWM PRAISE) in proteinske komplekse iz glivnega rodu *Pleurotus*, namenjene pridobivanju novih biopesticidov za zatiranje koloradskega in koruznega hrošča (J4-1772).

V raziskavah, ki zajemajo področje molekularne biologije in bioinformatike, smo v letu 2019 dokončali bioinformatične analize genomov dveh sevov bakterij *Bacillus firmus* I-1582 in *Bacillus* sp. ZZV12-4809, ki imata nematocidni učinek. Raziskave so razkrile širok nabor možnih nematocidnih determinant, kot so virulentne proteinaze, hitinaze in mnogi sekundarni metaboliti. **Prvi na svetu smo analizirali celoten genom bakterij *B. firmus* I-1582** iz sredstva za zatiranje rastlinsko-parazitskih ogorčic VOTIVO (Bayer). Genoma smo vnesli v javno dostopno zbirko GenBank in pokazali, da oba analizirana seva vsebujeta številne potencialne virulentne dejavnike, ki bi lahko pojasnili

2019

*As part of the department's activities aimed at identifying environmentally friendly plant protection methods focused on mitigating the risks associated with using plant protection products, we collaborated in projects that deal with low-risk methods (V4-1602, V4-1802), multifunctional soil biodiversity in horticulture (Excalibur), biodiversity in vineyard systems to mitigate damage, reduce pesticide use, and increase the provision of ecosystem services (BioVine), integrated weed management (IWM PRAISE), and protein complexes from the fungi genus *Pleurotus* for the creation of new biopesticides for controlling Colorado potato beetle and western corn rootworm (J4-1772).*

*In the field of molecular biology and bioinformatics research, we completed a bioinformatic analysis of the genomes of two strains of the bacteria *Bacillus firmus* I-1582 and *Bacillus* sp. ZZV12-4809, which have a nematocidal effect. The research revealed a broad spectrum of potential nematocidal determinants, such as virulent proteases, chitinases, and many secondary metabolites. We were the **first in the world to sequence the whole genome of the bacteria *B. firmus* I-1582** from the nematocide VOTIVO (Bayer). The genomes were entered in the open access database GenBank and we showed that both analysed*

Veliko raziskovalnega dela smo opravili na polju
A lot of research work was done in the field

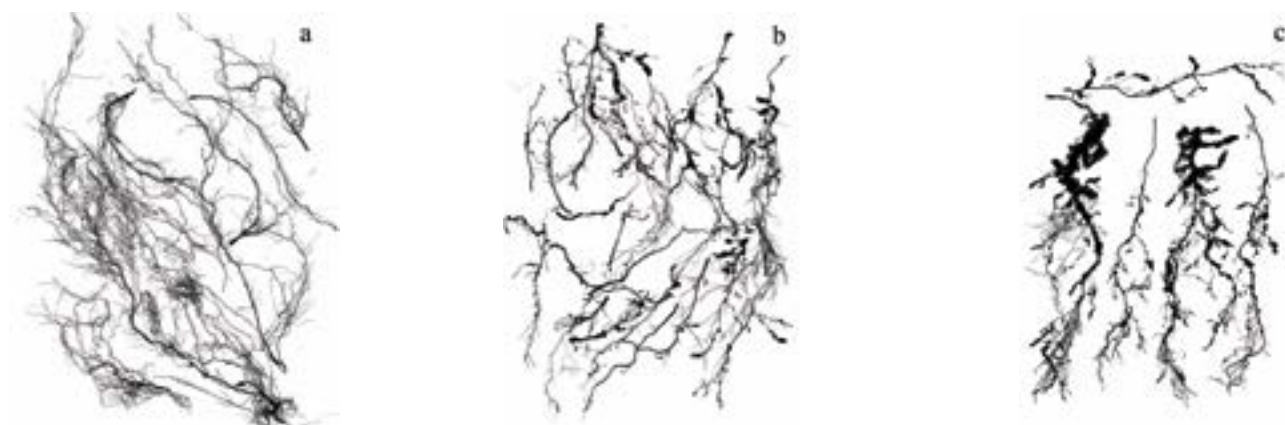


nematocidno delovanje teh bakterij. Genomski sekvenci sta dostopni pod akcesijsko številko: PRJNA533096. Dodatno smo določili zaporedje nukleotidov genoma ogorčic koreninskih šišk vrste *Meloidogyne luci* 'SI-Šmartno'. Populacija predstavlja edino obstoječo populacijo ogorčic *M. luci* v Sloveniji. Bioinformatične analize so pokazale, da je organizem najverjetneje triploid (AAB). 209,2 Mb dolga genomska sekvenca sestoji iz 327 kontigov (N50 = 1711905 bp) in **do danes predstavlja najpopolnejše zaporedje genoma vrste iz rodu *Meloidogyne* na svetu. Genom je dostopen pod akcesijsko številko: ERS3574357.**

Za preučevanje odpornosti škodljivih organizmov proti fitofarmacevtskim sredstvom smo vpeljali metodo za testiranje občutljivosti glive *Zymoseptoria tritici* za fungicide iz skupine azolov, kar nam bo v prihodnje omogočalo ugotavljanje morebitnih pojavov zmanjšanja občutljivosti te glive za delovanje fungicidov. V okviru spremljanja stanja odpornosti škrlupa proti fungicidom iz skupine strobilurinov (Qol fungicidi) smo s pomočjo molekularne metode (PCR), ki temelji na detekciji mutacije G143A na genu za citokrom b glive *V. inaequalis*, analizirali vzorce, pobrane iz različnih pridelovalnih območij Slovenije in pri večini ugotovili, da gre za mešanico odpornih in občutljivih izolatov.

*strains contain many potential virulent factors that may explain the nematocidal effect of these bacteria. The genome sequences are available under accession code PRJNA533096. We additionally sequenced the nucleotide of the genome of the root-knot nematode species *Meloidogyne luci* 'SI-Šmartno'. This population is the only existing population of *M. luci* in Slovenia. Bioinformatic analysis has shown that the organism is most likely a triploid. The 209.2 Mb genome sequence contains 327 contigs (N50 = 1711905 bp) and **is to date the most complete genome sequence of a species of the *Meloidogyne* genus in the world. The genome is accessible under accession code ERS3574357.***

*In the study of pest resistance to plant protection products, we introduced a method for testing the sensitivity of the fungus *Zymoseptoria tritici* to azole fungicides, which will allow us to carry out a review to determine the potential occurrence of reduced sensitivity of *Z. tritici*. As part of the monitoring of the resistance of scab to strobilurin fungicides (Qol fungicides), we applied the PCR molecular method, which is based on the detection of the G143A mutation on the gene for cytochrome of the fungus *V. inaequalis*, to analyse samples collected from various production areas in Slovenia. For the majority of the*



Morfološke spremembe na koreninah paradižnika po napadu z ogorčicami koreninskih šišk *Meloidogyne* spp.,
a) neokužene kontrolne rastline, b) nižja stopnja okužbe, c) višja stopnja okužbe
Tomato root morphological changes after infestation with root-knot nematodes Meloidogyne spp.,
a) non-inoculated control plants, b) low inoculum density, c) high inoculum density

V mednarodni raziskavi virusov češenj smo našli in opisali nov robogovirus, imenovan *Cherry Virus Turkey* (CVTR). V primerjavi s petimi najbolj sorodnimi smo pri CVTR opazili odsotnost dveh odprtih bralnih okvirjev (ORF 2a in 5a), ki pa sta pri ostalih prisotna.

Pri laboratorijskem delu smo poleg rednega diagnosticiranja škodljivih organizmov in s tem povezanimi aktivnostmi posameznih diagnostičnih laboratorijev za potrebe hitre detekcije ogorčic koreninskih šišk razvili dve molekularni metodi in sicer eno za detekcijo ogorčic iz skupine tropskih vrst ter drugo za detekcijo ogorčic iz skupine *Meloidogyne ethiopica*. Za namen identifikacije karantenskih vrst *Meloidogyne chitwoodi* in *M. fallax* smo vpeljali metodo za molekularno identifikacijo. Na projektu Melotrop smo organizirali med-laboratorijske primerjalne analize za učinkovitost metode (test performance study) na biološkem materialu 10 tropskih vrst ogorčic koreninskih šišk za partnerske inštitucije iz Francije (Anses), Portugalske (Univerza v Coimabri) in Nizozemske (NPP0-NL).

samples it was determined that they contain a mix of resistant and susceptible isolates. As collaborators in an international study of cherry viruses, we discovered and described a new robogovirus called Cherry Virus Turkey (CVTR). Unlike the five most closely related viruses, CVTR lacks two open reading frames (ORF 2a and 5a).

The laboratory work involved regular diagnostics of pests and associated activities by individual diagnostics laboratories, but we also devised two molecular methods for the rapid detection of root-knot nematodes, one for the detection of nematodes from a group of tropical species, and the second for the detection of the nematode species Meloidogyne ethiopica. We introduced a molecular identification method for the identification of the quarantine species Meloidogyne chitwoodi and M. fallax. As part of the project Melotrop, we organised comparative inter-laboratory analyses (a test performance study) of the biological material of 10 species of tropical root-knot nematodes for partner institutions in France (Anses), Portugal (the University of Coimbra), and the Netherlands.

Raziskave z novimi detekcijskimi metodami,
ki temeljijo na hiperspektralnem slikanju
*New detection methods in research using
hyperspectral imaging*



V okviru molekularnih analiz smo z namenom identifikacije ogorčic koreninskih šišek analizirali rezultate sekveniranja štirih mitohondrijskih genov. Razvili in vpeljali smo metode za detekcijo virusa A češnje (*Cherry virus A*, CVA) in metode za hkratno detekcijo štirih robigovirusov. Sodelovali smo tudi v študiji učinkovitosti metod (test performance study) za določanje virusa šarke (*Plum pox virus*, PPV) v okviru projekta Valitest in v medlaboratorijskem testu usposobljenosti za določanje virusa šarke (*Plum pox virus*, PPV), virusa pritlikavosti slive (*Prune dwarf virus*, PDV) in virusa nekrotične obročkaste pegavosti breskve (*Prunus necrotic ringspot virus*, PNRSV) z ELISA testom.

V raziskavah, v katere so vključene nove detekcijske metode, ki temeljijo na hiperspektralnem slikanju s kamero z veliko prostorsko natančnostjo, je bilo delo v letu 2019 v večji meri povezano z analizami satelitskih posnetkov satelitskega sistema Sentinel, ki poteka v okviru ciljnega raziskovalnega projekta V4-1811. Opravili smo tudi analizo posnetkov hiperspektralnega snemanja, vezanega na nekatere raziskovalne aktivnosti na oddelku (EFSA projekt GP/EFSA/ALPHA/2018/02, H2020 projekt Excalibur itn.).

To facilitate the identification of root-knot nematodes, we analysed the sequencing results of four mitochondrial genes. We developed and introduced methods for the detection of Cherry virus A (CVA) and a method for the concurrent detection of four robigoviruses. We also collaborated on a test performance study for identifying the plum pox virus (PPV) in the framework of the project Valitest, and in an inter-laboratory proficiency test for the identification of the plum pox virus (PPV), prune dwarf virus (PDV), and prunus necrotic ringspot virus (PNRSV) with the ELISA test.

Research involving new detection methods using high spatial resolution hyperspectral imaging focused largely on the analysis of Sentinel satellite images, which was carried out in the framework of the research project V4-1811. We also carried out analyses of hyperspectral images associated with some of the research at the department (the EFSA project GP/EFSA/ALPHA/2018/02, the H2020 project Excalibur, etc.).



Oddelek za kmetijsko tehniko in energetiko

—
*Department of
Agricultural
Engineering
and Energy*

Predstojnik / Head of department
dr. / Dr Viktor Ježič

Delo v Oddelku za kmetijsko tehniko in energetiko poteka na področju obnovljivih virov energije v kmetijstvu, racionalne rabe energije ter tehnologij za mehanizirano pridelavo in predelavo v kmetijstvu. Rezultati razvojno-raziskovalnega dela so razvite tehnologije in izdelki na področju obnovljivih virov energije in strojev za ciljno nanašanje fitofarmaceutskih sredstev ter evropski in nacionalni patenti. Sodelavci oddelka že vrsto let sodelujejo na področju razvoja in testiranja novih strojev in naprav tudi z domačo industrijo. V sklopu oddelka deluje tudi laboratorij za kmetijsko tehniko s sodobno merilno opremo za opravljanje laboratorijskih in terenskih raziskav s kmetijskimi stroji ter kmetijsko procesno tehniko.

The work of the Department of Agricultural Engineering and Energy revolves around renewable energy sources in agriculture, efficient energy use, and technologies for mechanised production and processing in agriculture. The result of the research and development work includes technologies and products for renewable energy sources and targeted application of plant protection products, and European and national patents. The staff has been working for many years on the development and testing of new machinery and devices, including for domestic industry. The department also has an agricultural technology laboratory with cutting-edge measuring equipment for laboratory and field testing of agricultural machinery and processing technology.

RAZISKOVALNO DELO

- Področje učinkovite rabe energije v kmetijstvu, poudarek na racionalizaciji delovnih postopkov ob uporabi primerne mehanizacije in upoštevanju čedalje strožjih okoljevarstvenih zahtev (okoljski odtis kmetijstva v povezavi z uporabo kmetijskih strojev in različnih tehnologij ter ukrepi za zmanjševanje emisij toplogrednih plinov v kmetijstvu)
- Področje alternativnih virov energije v kmetijstvu (bioplin, biometan, rastlinsko olje, trdna kmetijska biomasa za energetske namene, ...)
- Področje tehnologij za energijsko učinkovito in okolju prijaznejšo pridelavo ter predelavo hrane

RESEARCH

- Efficient use of energy in agriculture, with an emphasis on work procedures in the use of machinery and compliance with increasingly stringent environmental standards (agriculture's environmental footprint in connection with the use of agricultural machinery and technology, and measures to reduce greenhouse gas emissions in agriculture)
- Alternative energy sources in agriculture (biogas, biomethane, vegetable oil, solid biomass for energy purposes, etc.)
- Technologies for energy efficient and environmentally friendlier food production and processing

STROKOVNO DELO

- Svetovanja na področju predpisov in smernic EU o varnosti kmetijskih strojev in strojev za varstvo rastlin
- Testiranje traktorjev, priključnih, samovoznih in drugih strojev v eksploatacijskem delovanju, namenjenih delu v poljedelstvu, sadjarstvu, vinogradništvu, živinoreji, zelenjadarstvu, ...)
- Organizacija praktičnih vaj ter aktivno vključevanje v raziskovalno in pedagoško delo različnih fakultet in visokih šol
- Svetovanje končnim uporabnikom o izbiri, uporabi in vzdrževanju kmetijskih strojev
- Strokovni seminarji s področja kmetijske in procesne tehnike
- Organizacija letnega dogodka Slovensko srečanje ljubiteljev starodobne kmetijske tehnike v Jabljah

EXPERT WORK

- Consultancy on EU regulations and guidelines concerning the safety of agricultural machinery and plant protection machinery
- Testing of tractors, towed, powered, and other machinery for crop farming, fruit growing, viticulture, animal production, horticulture, etc.
- Organisation of practical exercises and active involvement in research and pedagogical work at higher education institutions
- Advisory services for end users regarding the selection, use, and maintenance of agricultural machinery
- Seminars on agricultural and processing technology
- Organisation of the annual Slovenian meeting of fans of vintage farming machinery in Jablje

STORITVE

- Obnovljivi viri energije v kmetijstvu in drugih področjih uporabe
- Učinkovite rabe energije v kmetijski pridelavi in predelavi
- Tehnologije mehanizirane kmetijske pridelave in predelave
- Seminarji in tečaji za zmanjševanje porabe energije v kmetijstvu
- Določanje odtisa CO₂ za različne tehnologije pridelave in predelave hrane ter drugih kmetijskih produktov
- Razvoj tehnologij za procesiranje semena oljnic in drugih rastlin v olja za različne namene
- Tehnologije za proizvodnjo bioplina in biometana
- Tehnologije za čiščenje in uporabo očiščenega odpadnega jedilnega olja za pogon strojev in kogeneracijo na rastlinsko olje
- Tehnologije za procesiranje odpadne kmetijske biomase za energetske in druge namene

SERVICES

- Renewable energy sources in agriculture and other areas of use
- Efficient energy use in agricultural production and processing
- Technologies applied in mechanised agricultural production and processing
- Seminars and courses for reducing energy use in agriculture
- Measuring the CO₂ footprint of various production and processing techniques for food and other agricultural products
- Development of technologies for processing the seeds of oil plants and processing other plants into oils
- Technologies for biogas and biomethane production
- Technologies for the purification of waste edible oils and the use of purified oils as motor fuel or in vegetable oil cogeneration
- Technologies for converting waste agricultural biomass into energy and for other uses

2019**Projektna dejavnost**

Delo oddelka je potekalo na različnih domačih in tujih projektih. V triletnem projektu CRP »Tehnološke rešitve za spravilo kakovostnega sena« (zaključek v letu 2019) smo proučevali spravilo sena s sušenjem na tleh z različnimi postopki, stroje za spravilo sena in sisteme za njegovo dosuševanje ter njihov vpliv na kakovost sena, porabo energije in ekonomičnost pridelave. S pazljivo izbiro obratovalnih parametrov strojev za obračanje, lahko zmanjšamo skupne izgube pridelka od 3,1 do 5,9 %. Ugotovljeno je, da uporaba sončne strehe zmanjšuje stroške sušenja ne glede na uporabljeno drugo tehnologijo sušenja. V sklopu CRP projekta »Vzpostavitev sistema vzorčnih kmetij za namen stalnega spremljanja kazalcev trajnostnega kmetijstva« smo spremljali kazalnike s področja energije, obnovljivih virov energije, učinkovite rabe energije, energije za namakanje, itn. Za EIP projekt »Žrnate stročnice« smo razvili in izdelali napravo za termično obdelavo soje z avtomatsko regulacijo temperature. Soja se med termično obdelavo obrača v ogrevanem bobnu (število vrtljajev se lahko brezstopenjsko spreminja). Za termično obdelavo so uporabljene posebne izvedbe IR grelcev. Za potrebe proučevanja vpliva temperature

2019**Project activity**

Several domestic and international projects were ongoing in 2019. In the three-year CRP project *Technological solutions for harvesting quality hay* (completed in 2019), we researched hay harvesting with drying on the ground using a variety of procedures, harvesting machinery, and drying systems, and their impact on hay quality, energy use, and the economics of production. By carefully selecting the operating parameters of hay tedders, total product loss can be reduced by 3.1-5.9%. It was determined that using solar collectors reduces drying costs, notwithstanding other drying techniques applied. In the framework of the CRP project *Establishment of a reference agricultural holding system for the purpose of permanent monitoring of indicators of sustainable agriculture*, we monitored indicators measuring renewable energy sources, efficient energy use, energy for irrigation, etc. For the EIP project *Legumes*, we developed and manufactured a device for the heat processing of soy with automatic temperature regulation. During heat treatment the soy is turning in a heated drum (the number of revolutions is continuously variable). Specially designed IR heaters were used as heat sources.



Pogled v notranjost mikro čistilne naprave AIS OIL 19 za čiščenje odpadnega jedilnega olja za pogon delovnih strojev in kogeneratorjev

Inside view of the AIS OIL 19 micro oil cleaning plant for cleaning waste cooking oil for powering of working machines or cogenerators



Mikro bioplinjska naprava z dodatnim sistemom za čiščenje in nadgradnjo bioplina do faze biometana, 1 – digester, 2 – nadgradnja bioplina do faze biometana, 3 – zalogovnik plina, 4 – hidrolizna posoda, 5 – enota za doziranje odpadne trdne biomase

Micro biogas plant with additional system for purification and upgrading of biogas to biomethane phase, 1 - digester, 2 - upgrading of biogas to biomethane, 3 - biogas storage tank, 4 - hydrolysis tank, 5 - unit for dosing waste solid biomass

na fizikalno-kemične lastnosti soje se lahko spreminja: temperatura segrevanja, število vrtljajev bobna in čas segrevanja soje. Za EIP projekt – »Koruzni oklasek kot obnovljivi vir energije« je delo potekalo na analizi možnosti uporabe koruznih oklaskov kot obnovljivega vira energije in razvoju tehničnih rešitev za njegovo uporabo. Delali smo na idejni zasnovi sistema za ločevanje ostalih delov rastline od klasincev ter njihovo zbiranje pri žetvi koruze s kombajni. Razvito je bilo nekaj možnih izvedb sistemov za ločevanje klasincev. Potekalo je tudi delo na pregledu in izbiri ustreznih tehnologij za pripravo klasincev za kurjenje. Na dveh EIP projektih »Uvedba novih mehanskih in avtonomnih avtomatiziranih tehnologij za trajnostno pridelavo grozdja v vinogradih« in »Zmanjšanje obremenitev iz kmetijstva na površinske in podzemne vode« (začetek v novembru in decembru 2019) pa smo začeli z uvodnimi projektnimi aktivnostmi. Na EU - LIFE projektu »Climate Path to 2050« smo delali na projekcijah za porabo energije v slovenskem kmetijstvu do leta 2030 oziroma 2050. Definirali smo tehnologije, ki se bodo v prihodnosti uporabljale v kmetijski pridelavi in predelavi. Poleg tega smo definirali tehnologije, ki jih bo potrebno aplicirati zaradi zmanjševanja porabe energije ter emisij toplogrednih plinov.

To study the impact of temperature on the physical and chemical properties of soy, it is possible to adjust the heating temperature, drum revolutions, and heating time. For the EIP project Corn cobs as a renewable energy source, we analysed the potential of using corn cobs as a renewable source of energy and the development of technological solutions for practical application. We worked on the concept of a system for separating the cob from the rest of the plant and collecting it during combine harvesting. Several versions of the system for the separation of cobs were developed and work was conducted concerning the review and selection of suitable technologies for preparing cobs for burning. Preliminary project activities started (in November and December 2019) on two EIP projects, Implementation of new mechanical and autonomous automated technologies for the sustainable production of grapes in vineyards and Reducing agricultural pollution on surface water and groundwater. In the EU-LIFE project Climate path to 2050, we worked on projections of energy use in Slovenian agriculture until 2030 and 2050. We identified technologies that will be used in agricultural production and processing in the future, and technologies that will need to be applied to reduce energy consumption and greenhouse gas emissions.



Enota za čiščenje in nadgradnjo bioplina do faze biometana
Unit for cleaning and upgrading biogas to the biomethane phase



Stiskalnica AIS P 60 za mehansko ekstrakcijo oljnic z novo geometrijo stiskalnega dela
AIS P 60 press for mechanical extraction of oilseeds with a new geometry of the pressing part

Tržna dejavnost

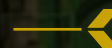
Razvijali smo tehnologijo za procesiranje semena oljnic in nekaterih drugih rastlin v mikro oljarnah z mehansko ekstrakcijo semena s kontinuiranimi stiskalnicami ter nadaljnje procesiranje rastlinskega olja za različne namene (rastlinska olja se poleg tradicionalne vloge v prehrani uporabljajo tudi za farmacevtske, industrijske, energetske in druge namene). Oddelek je v letu 2019 projektiral in izdelal več stiskalnic tipa AIS P 60 in AIS P 95 za mehansko ekstrakcijo oljnic, naročniki so bili kmetije in podjetja. Za potrebe čiščenja odpadnega jedilnega olja smo razvili mikro čistilno postajo AIS OIL CLEAN (naročnik podjetje Bimas). Očiščeno olje se lahko uporabi za energetske in tehnične namene. Omenjena postaja je kontejnerske izvedbe (tip »Plug and Play«), ki omogoča enostaven transport in manipulacijo ter uporabo na različnih lokacijah. Očiščeno rastlinsko olje se lahko uporabi kot pogonsko gorivo za delovna vozila in stroje ter kogeneracijo na olje (istočasna proizvodnja toplotne in električne energije). Za pogon delovnih vozil in strojev na odpadno jedilno olje smo razvili enoto AIS OIL MOBIL (naročnik podjetje Bimas). Omenjena enota deluje po sistemu dveh rezervoarjev, za zagon je namenjeno mineralno dizelsko gorivo, za delovanje motorja, ko se doseže delovna temperatura, pa olje (delovanje enote nadzoruje elektronski sistem). Začeli smo tudi z zasnovo nove generacije kogeneratorske enote na odpadno jedilno olje.

Commercial activities

We develop technology for processing the seeds of oil plants and selected other plants in micro oil mills using mechanical seed extraction with continuous presses, and the subsequent processing of vegetable oils for a variety of uses (aside from their traditional use in food, vegetable oils also have pharmaceutical, industrial, energy, and other uses). In 2019 the department designed and manufactured several type AIS P 60 and AIS P 95 presses for the mechanical extraction of oil from plants for farms and companies. A micro cleaning station, AIS OIL CLEAN, was developed for the cleaning of waste edible oils (for the company Bimas). The purified oil can be used as an energy input or for technical purposes. The cleaning station is a container design (Plug and Play); its simple transportation and handling make it easy to deploy at a variety of locations. The purified vegetable oil can be used as motor fuel for work vehicles and machinery, and in cogeneration (concurrent production of heat and electrical energy). The unit has a two-tank design: diesel fuel is used for start-up and the system switches to oil once the operating temperature is reached (the unit has an electronic control system). We also started designing a next-generation cogeneration plant powered by waste edible oil.



Oddelek za ekonomiko kmetijstva



*Agricultural
Economics
Department*

Predstojnik / Head of department**Tomaž Cunder**

Delo oddelka je osredotočeno na spremljanje in analizo stanja v kmetijstvu, ocenjevanje proizvodnih stroškov v kmetijstvu, spremljanje in analizo kmetijske politike, razvoj sodobnih metod ekonomske analize v kmetijstvu ter ugotavljanje ekonomskega vidika razvoja podeželja.

The department monitors and analyses the state of agriculture, estimates agricultural production costs, monitors and analyses agricultural policy, develops modern methods of economic analysis in agriculture, and evaluates the economic aspects of rural development.

RAZISKOVALNO DELO

- Razvoj celovitih modelov kmetijskih gospodarstev in povezanih podatkovnih zbirk za podporo pri odločanju
- Opredelitev parametrov trajnostnega kmetijstva v Sloveniji
- Analiza učinkov kmetijske politike z modelom tipičnih kmetijskih gospodarstev
- Presoja ukrepov kmetijske politike z vidika podnebnih sprememb
- Optimiranje proizvodnih postopkov za povečanje dodane vrednosti v kmetijstvu
- Obdelanost in trajnostna raba kmetijskega prostora v Sloveniji
- Analitična podpora pri uveljavljanju reforme SKP na področju neposrednih plačil
- Večnamenskost kmetijstva in njeno vrednotenje
- Stroški kmetijske pridelave v različnih območjih z omejenimi možnostmi za kmetijsko pridelavo

RESEARCH

- Development of comprehensive models of agricultural holdings and connected databases that support decision-making
- Definition of parameters of sustainable agriculture in Slovenia
- Analysis of the effects of agricultural policy using model agricultural holdings
- Evaluation of the climate change aspects of agricultural policy measures
- Optimisation of production procedures aimed at increasing value added in agriculture
- Cultivation and sustainable use of agricultural land in Slovenia
- Analytical support in the implementation of the direct payment aspects of CAP reform
- The multifunctionality of agriculture and evaluation thereof
- Agricultural production costs in various agriculturally less favoured areas

STROKOVNO DELO IN STORITVE

- Izdelava modelnih kalkulacij stroškov v kmetijstvu
- Izdelava bilanc proizvodnje in porabe osnovnih kmetijskih proizvodov
- Analiza stanja v kmetijstvu
- Spremljanje razvoja kmetijstva v območjih z omejenimi možnostmi za kmetijsko dejavnost (OMD)
- Analiza mreže računovodskih podatkov s kmetijskih gospodarstev (FADN)
- Spremljanje in analiza ukrepov kmetijske politike za OECD
- Ekspertne storitve za potrebe Ministrstva za kmetijstvo, gozdarstvo in prehrano
- Druge naloge po naročilu resornega ministrstva
- Naloge in ekspertize za druge naročnike (ministrstva, občine, združenja)

EXPERT WORK AND SERVICES

- Model calculations of agricultural costs
- Production and consumption balances for agricultural raw materials
- Analysis of the state of agriculture
- Monitoring the development of agriculture in agriculturally less favoured areas (LFA)
- Analysis of the Farm Accountancy Data Network (FADN)
- Monitoring and analysis of agricultural policy measures for the OECD
- Expert services for the Ministry of Agriculture, Forestry and Food
- Other tasks commissioned by the competent ministry
- Tasks and expert opinions for other clients (ministries, municipalities, associations)



Planinsko pašništvo, tradicionalna oblika za zagotavljanje obdelanosti mejnih kmetijskih zemljišč

Alpine pasture, a traditional form of ensuring the cultivation of marginal agricultural land



Pomembna vloga kmetijstva v Območjih z omejenimi dejavniki za kmetijsko pridelavo

The important role of agriculture in Areas with aggravated production conditions for agricultural

2019

Na oddelku je bilo pretežen del leta 2019 zaposlenih deset sodelavcev, od tega devet raziskovalcev in ena tehnična sodelavka. Z organizacijsko-zaposlitvenega vidika se je v tem letu nadaljevala kadrovska prenova, ki je imela za posledico delno prerazporeditev delovnih nalog na oddelku. Sicer pa je bilo v skladu z opredeljenimi dolgoročnimi usmeritvami tudi v tem letu delo usmerjeno v številna strokovna in raziskovalna področja.

V okviru programske skupine Ekonomika agroživilstva in naravnih virov, ki združuje raziskovalce vseh raziskovalnih organizacij, ki se v Sloveniji znanstveno ukvarjajo s področjem agrarne ekonomike, se je v okviru številnih skupnih raziskovalnih projektov nadaljevalo delo na proučevanju ekonomskih procesov in strukturnih sprememb na področju kmetijstva, živilstva in razvoja podeželja.

Osrednje področje raziskovalnega dela so tudi v letu 2019 predstavljali Ciljno raziskovalni projekti (CRP). Pri 4 projektih iz razpisa CRP »Zagotovimo.si hrano za jutri

2019

The department had ten employees in 2019, i.e. nine researchers and one technical staff member. Organisational and human resources restructuring continued as planned, resulting in the partial reassignment of tasks within the department. In accordance with long-term guidelines, the work spanned a variety of expert and research fields.

In the framework of the programme group Agro-food and Natural Resources Economics, which brings together members of all research organisations in Slovenia involved in agricultural economics research, work continued on numerous joint research projects dealing with economic processes and structural changes in agriculture, the food industry, and rural development.

CRP projects remained at the core of the department's research work in 2019. Research entered the final year in four projects under the 2016 CRP open call Securing the food for tomorrow. Among the most notable achievements was the creation of a comprehensive

za leto 2016« je delo na raziskavah prešlo v zadnje leto raziskav. Med pomembnejšimi velja izpostaviti projekt »Učinki in perspektive SKP na slovensko kmetijstvo in podeželje«, v okviru katerega je skupina raziskovalcev Oddelka za ekonomiko kmetijstva vzpostavila obsežen in celovit sistem kazalnikov za vrednotenje uspešnosti in učinkovitosti kmetijske politike in politike razvoja podeželja. Rezultati so bili objavljeni in publicirani v okviru znanstvene monografije »Vrednotenje slovenske kmetijske politike v obdobju 2015–2020«. Ob projektih, ki so se v obravnavanem letu zaključevali, pa je potekalo tudi nadaljevanje dela na 6 raziskovalnih projektih, ki so bili pridobljeni na razpisu CRP »Zagotovimo.si hrano za jutri za leto 2018«.

Na področju strokovnega dela je oddelek tudi v letu 2019 večino časa namenjal izvajanju redne strokovne naloge Spremljanje razvoja kmetijstva v Sloveniji. Poleg nje je v okviru javnih razpisov s strani različnih naročnikov pridobil še dve strokovni nalogi: Presoja dosežkov in vplivov Programa razvoja podeželja Republike Slovenije za obdobje 2014–2020 in Oblikovanje statističnega sistema za bilanci glavnih žit in oljnic po naročilu Statističnega urada Republike Slovenije (SURS).

Projekt Presoja dosežkov in vplivov Programa razvoja podeželja Republike Slovenije za obdobje 2014–2020, ki ga je v sodelovanju z združenjem Deloitte v letu 2019 izvajal Oddelek za ekonomiko kmetijstva, je sestavni del izvajanja Programa razvoja podeželja in zagotavlja pomembne in pravočasne povratne informacije za Organ upravljanja pri Ministrstvu za kmetijstvo, gozdarstvo in prehrano. Obsežno poročilo vrednotenja je vključevalo metodološka izhodišča, analizo in interpretacijo rezultatov. Vsi ti vsebinski sklopi so predstavljali podlago za odgovore na skupna in programsko specifična vprašanja za vrednotenje. Skupna vprašanja za vrednotenje (SV) 1–18 so obravnavala in analizirala posamezna prednostna

system of indicators for evaluating the efficiency and effectiveness of agricultural policy and rural development policy, which was developed by a group of researchers at the Agricultural Economics Department in the framework of the project The impact of CAP and perspectives on Slovenian agriculture and rural areas. The results were published in the scientific monograph Evaluation of Slovenian agricultural policy in the 2015–2020 period. Aside from the projects that concluded in 2019, work continued on six research projects selected in the 2018 CRP open call Securing the food for tomorrow.

In terms of expert work, the department dedicated most of its resources to the implementation of the regular expert task Monitoring the development of agriculture in Slovenia. It secured a further two expert tasks in open calls: Evaluation of the achievements and impacts of the national Rural Development Programme for 2014–2020, and Creation of a statistical system for supply balance sheets for oil plants and cereals, which was commissioned by the Statistical Office of the Republic of Slovenia (SURS).

The project Evaluation of the achievements and impacts of the national Rural Development Programme for 2014–2020, carried out by the department in 2019 in collaboration with Deloitte, is an integral part of the implementation of the Rural Development Programme and provides essential and timely feedback to the managing authority at the Ministry of Agriculture, Forestry and Food. This wide-ranging evaluation report included methodological guidelines, an analysis, and an interpretation of the results. These segments form a basis for answering common and programme-specific evaluation questions. The common evaluation questions 1 through 18 dealt with and analysed individual priorities, whereas questions 19 through 30 dealt with selected specific topics (such as the National Rural Network and



Poljedelstvo, prednostna proizvodna usmeritev v ravninskih in nižinskih območjih Slovenije

Arable land production, priority orientation in the plains and lowlands of Slovenia



Ugodne klimatske razmere omogočajo razvoj vinogradništva v posameznih regijah

Favorable climatic conditions enable the development of viticulture in individual regions

področja (PP) PRP, SVV 19-30 pa so obravnavala nekatere specifične teme (kot sta Mreža za podeželje in tehnična pomoč) ter presečne teme (kot so sinergije, skladnost s cilji strategija Evropa 2020, konkurenčnost kmetijstva, okolje in upravljanje virov, uravnotežen teritorialni razvoj in inovacije). Poleg skupnih vprašanj je vrednotenje vključevalo tudi vrsto programsko specifičnih vprašanj za vrednotenje (PSVV), ki so pokrivala določene presečne teme, kot so enakost moških in žensk, trajnostni razvoj, vpliv naložb (na digitalizacijo, uspešnost in učinkovitost kmetijskih gospodarstev) in vpliv PRP na habitate in biotsko raznovrstnost.

Osnovni cilj naloge Oblikovanje statističnega sistema za bilanci glavnih žit in oljnic je bila priprava metodoloških izhodišč in sistema bilanc za glavne vrste žit in oljnic. Naloga je bila izdelana v okviru posebne »grant« pogodbe z Evropskim statističnim uradom Eurostat, v pripravo pa je bil aktivno vključen tudi Statistični urad Republike Slovenije (SURs). V okviru letnega poročila za leto 2019 (rezultatov bilanc za koledarsko leto 2018) sta bili izdelani bilanci za glavne vrste žit in oljnice ter poročilo o kakovosti v standardni predpisani obliki.

technical assistance) and cross-sectional topics (such as synergies, compliance with the aims of the Europe 2020 strategy, the competitiveness of agriculture, the environment and management of resources, balanced territorial development, and innovations). In addition to the common topics, the evaluation included a number of programme-specific evaluation questions that covered cross-sectional topics such as gender equality, sustainable development, the impact of investments (on the digitalisation, performance, and efficiency of agricultural holdings), and the impact of the Rural Development Programme on habitats and biodiversity.

The underlying objective of the task Creation of a statistical system for supply balances for oil plants and cereals was to prepare the methodological groundwork and a system of balances for the principal types of cereals and oil plants. The expertise was prepared within the special "grant" contract with the European Statistical Office Eurostat, and the Statistical Office of the Republic of Slovenia (SURs) was also actively. The annual report for 2019 (the results of balances for the calendar year 2018) included the balance for the principal types of cereals and oil plants, and a quality report in the prescribed standard format.

Oddelek za kmetijsko ekologijo in naravne vire



*Department of
Agricultural Ecology
and Natural Resources*

Predstojnik / Head of department
dr. / Dr Borut Vrščaj

Aktivnosti Oddelka za kmetijsko ekologijo in naravne vire posegajo na področje trajnostne rabe tal oziroma ohranjanja kakovosti in rodovitnosti kmetijskih zemljišč, problematiko kroženja snovi (rastlinskih hranil in onesnaževal), zmanjšanje vplivov kmetijstva na podzemne in površinske vode, varovanje kmetijskih zemljišč in naravnih virov (tla in vode), izpustov in ponorov toplogrednih plinov v kmetijstvu, ohranjanje biotske pestrosti in kmetijske krajine, integrirano varstvo pred pleveli in škodljivci, delovanje in ekologijo fitofarmaceutskih sredstev (FFS). Velik poudarek gre geoinformatiki tal in okolja, t.j. aktivnostim zbiranja in obdelave podatkov tal in okolja; prostorskemu modeliranju podatkov (GIS) in izvajanju novih informacij o lastnostih in kakovosti tal ter samih agro- in urbanih ekosistemih.

Sodelavci oddelka aktivno sodelujemo pri povezovanju državne uprave, raziskovalnih in strokovnih ustanov ter služb v Sloveniji (MKGP, MOP, ARSO, GIS, Univerza v Ljubljani) in tujini (FAO, EC JRC Ispra) ter nudimo neposredno podporo kmetijskim pridelovalcem, gospodarstvu, državnii upravi, okoljevarstvenikom in izobraževanim organizacijam.

The activities of the Department of Agricultural Ecology and Natural Resources span the sustainable use of soil resource, soil quality and fertility and land management soil, cycling of plant nutrients and contaminants), reduction of the impact of agriculture on groundwater and surface waters, protection of agricultural land and natural resources (soil and water), greenhouse gas emissions and sinks in agriculture, protection of biodiversity and the agricultural landscape, integrated protection against weeds and pests, and the modes of action of pesticides and their ecology. Great emphasis is placed on the geoinformatics of soil and the environment (i.e. the collection and processing of soil and environmental data), spatial data modelling (GIS), and the deployment of new information on the properties and quality of soil and agricultural and urban ecosystems.

The department's staff actively collaborate with the state administration, research and expert institutions and services in Slovenia (the Ministry of Agriculture, Forestry and Food, the Ministry of the Environment and Spatial Planning, the Environment Agency, Slovenian Forestry Institute and the University of Ljubljana) and abroad (the UN Food and Agriculture Organization, the EC Joint Research Centre in Ispra) and provide direct support to producers, businesses, the state administration, environmentalists, and educational organisations.

RAZISKOVALNO DELO

- Kakovost tal in agro-ekosistemov
- Pedologija in klasifikacija tal
- Geneza in degradacija tal
- Trajnostna raba kmetijskih zemljišč in ohranjanje rodovitnosti tal
- Zmanjšanje vplivov kmetijstva na podzemne ter površinske vode
- Kroženje snovi/hranil v in skozi tla
- Spremljanje in bilanca izpustov ter ponorov toplogrednih plinov v kmetijstvu
- Ohranjanje biotske pestrosti in kulturne kmetijske krajine
- Monitoring širjenja invazivnih rastlin in integrirano varstvo pred pleveli
- Ekologija in posledica rabe fitofarmacevtskih sredstev v agro-ekosistemi
- Zatiranje škodljivcev in plevelov
- Preučevanje ustreznosti kmetijskih tehnologij in načinov obdelave tal
- Analitika tal in učinkovanje gnojil
- Geo-informatika tal in okolja
- Prostorsko GIS-modeliranje in digitalna kartografija tal
- Razvoj GIS-spletnih predstavitev podatkov tal in okolja

RESEARCH

- Soil and agroecosystem quality
- Soil science and soil classification
- Soil genesis and degradation
- The sustainable use of agricultural land and soil fertility management
- Reduction of impacts of agriculture on groundwater and surface waters
- Circulation of matter/nutrients into and through the soil
- Monitoring and the balance of greenhouse gas emissions and sinks in agriculture
- Preservation of biodiversity and the agricultural landscapes
- Monitoring the spread of invasive plants and integrated weed control
- Ecology and the consequences of pesticide use in agroecosystems
- Pest and weed control
- Research of the adequacy of agricultural technologies and tillage methods
- Soil analytics and fertiliser efficacy
- Soil and environment geo-informatics
- Spatial GIS modelling and digital soil mapping
- Development of an online GIS soil and environmental data presentations

STROKOVNO DELO IN STORITVE

- Kmetijska ekologija (presoja vplivov kmetijstva na okolje); izvajanje nitratne direktive (kmetijstvo na vodovarstvenih območjih)
- Vzorčenje tal in pridelkov z vrednotenjem kakovosti ter onesnaženosti
- Gnojenje in rodovitnost tal (analiza založenosti tal s hranili, interpretacija in gnojilni nasveti)
- Onesnaženost tal (vsebnost težkih kovin in organskih onesnažil, interpretacija tveganj, nasveti)
- Informatika tal in kmetijskega okolja (digitalna kartografija tal, zajem podatkov tal in okolja, GIS-presoje, modeliranja in analize, razvoj Talnega informacijskega sistema – eTLA)
- Ocena bonitet in kakovosti kmetijskih zemljišč (ekspertize kakovosti tal, elaborati bonitete tal)
- Melioracija in hidromelioracija tal (ocena sanacij hm-sistemov)
- Priprava strokovnih podlag in metodologij vrednotenja (primernost tal, kakovost kmetijskih zemljišč)
- Herbologija (spremljanje tujerodnih in invazivnih vrst, izdelava ekoloških profilov in ocen tveganj ter tehnološka navodila za zatiranje invazivnih vrst)
- Vpliv FFS v okolju (preizkušanje učinkovitosti in fitotoksičnosti FFS)
- Pedologija (pedološko kartiranje, bonitiranje in raziskave kakovosti tal)
- Izobraževanje s področja kmetijske ekologije (FFS, pleveli, tla in pedologija, ekopedologija ter raba in varstvo tal, kakovost kmetijskih zemljišč ter gnojenje)

EXPERT WORK AND SERVICES

- Agricultural ecology (evaluation of agriculture's impact on the environment); implementation of the Nitrates Directive (agriculture in water protection areas)
- Soil and crop sampling with an evaluation of quality and pollution
- Fertilisation and the fertility of the soil (nutrient stocks analysis, interpretation and fertilisation advisory)
- Soil pollution (heavy metals and organic soil contaminants, interpretation of soil contamination risks, advice)
- Soil and agricultural environment data (digital soil maps, the capture of soil and environmental data, GIS evaluation, modelling and analysis, development of the eSOIL Soil Information System)
- Estimation of agricultural land rating and quality (expert analysis of soil quality, land rating expert reports)
- Melioration and hydro melioration (estimates of the rehabilitation of hydro melioration systems)
- Preparation of technical manuals and valuation methodologies (soil suitability, quality of agricultural land)
- Herbology (monitoring of alien and invasive species, design of ecological profiles and risk assessments, technological instructions for the control of invasive species)
- The fate of plant protection products in the environment (testing the efficacy and phytotoxicity of plant protection products)
- Pedology (pedological mapping, rating, and soil quality research)
- Training on agricultural ecology (plant protection products, weeds, soil and soil science, soil ecology, soil and land use protection, the quality of agricultural land and fertilisation)

Mehansko zatiranje plevla v poskusu z zeljem s prstastim okopalnikom
Mechanical weed control in the cabbage trial with finger weeder



2019

Aktivnosti oddelka v letu 2019 so bile osredotočene predvsem na učinek kmetijske dejavnosti na okolje in raziskave s področja novih tehnologij pridelave za zmanjšanje okoljske obremenitve v kmetijski pridelavi.

Tako je oddelek izvajal strokovne naloge s področja okolja za Ministrstvo za okolje in prostor za vsebine, ki se nanašajo na kmetijstvo na vodovarstvenih območjih, izvajanje EU Nitratne direktive, varstva tal ter zmanjšanje izpustov onesnaževal v zrak iz kmetijstva ter zagotavljanja in kontrole kakovosti evidenc emisij toplogrednih plinov.

Opravili smo analizo rodovitnosti tal in vsebnosti nevarnih snovi v tleh in pridelkih na vodovarstvenih območjih v Mestni občini Ljubljana ter na območju vodarne Brest pri Igu ter analizirali kakovost tal na urbanih vrtičkih v Mestni občini Ljubljana. Za mestno občino Celje smo izvedli študijo možnosti Remediacije tal območja Stare

2019

The department's activities in 2019 focused on agriculture's impact on the environment and studies concerning new production technologies that reduce the environmental footprint of agricultural production.

The department thus carried out expert environmental tasks for the Ministry of the Environment and Spatial Planning concerning agriculture in water protection areas, the implementation of the EU's Nitrates Directive, soil protection, reduction of the release of agricultural pollutants into soil, and provision of the records of greenhouse gas emissions, complete with data quality control.

We carried out an analysis of soil fertility and checked the presence of hazardous substances in soil and crops in groundwater protection areas in the Ljubljana Urban Municipality and the area covered by the Brest water pumping station near Ig, and analysed soil quality in



Vzorčenje talnih živali
Sampling of soil fauna

Cinkarne z organo-mineralnim substratom ter opravili geostatistično oceno onesnaženosti tal v Mestni občini Celje, z namenom zajema podatkov onesnaženosti tal s težkimi kovinami.

V večjem nacionalnem projektu smo za potrebe nacionalnega poročanja emisij in ponorov toplogrednih plinov v sektorju LULUCF, ki ga izvaja Ministrstvo za kmetijstvo, gozdarstvo in prehrano, ocenili zaloge ogljika v tleh in lesnih ostankih za na kmetijskih zemljiščih. V okviru znanstvenih projektov nacionalnega Ciljnega raziskovalnega programa (CRP) smo z namenom zmanjšanja uporabe herbicidov v kmetijstvu preučevali izbora najprimernejših nekemičnih metod zatiranja plevela kot nadomestilo za uporabo glifosata in drugih herbicidov za slovenske razmere (CRP Metode zatiranja plevelov). V istem programu smo vzpostavljali sistem vzorčnih kmetij za namen stalnega spremljanja kazalcev trajnostnega kmetijstva (CRP Vzpostavljanje vzorčnih

urban gardens in the Ljubljana Urban Municipality. For the Celje Urban Municipality, we carried out a feasibility study on soil remediation in the area of the Stara Cinkarna plant (a former zinc plating plant) with organic and mineral substrate, and a geostatistical evaluation of soil pollution in the municipality aiming to provide heavy metal soil pollution data.

For a large national project managed by the Ministry of Agriculture, Forestry and Food, we estimated carbon stocks in soil, wood residue, and agricultural land for national reporting of greenhouse gas emissions and sinks in the LULUCF sector. As part of projects under the national CRP programme, we studied the selection of the most appropriate non-chemical weed control methods as a replacement for glyphosate and other herbicides in Slovenia (CRP project Weed control methods); the aim is to reduce the use of herbicides in agriculture. In the same programme, we worked on establishing a

Tehtanje pridelka na trajnem travinju

Weighing of fodder yield from dry grassland



kmetij); ta bo pripomogel k možnostim sistematičnega spremljanja vplivov kmetijstva na okolje, ekonomsko učinkovitost pridelave, učinek podeljenih kmetijskih podpor in konkurenčnost kmetij. Pomembne podatke o zalogah organskega ogljika v tleh (vsebnosti humusa) smo pridobili v CRP projektu Spremljanje zalog ogljika v kmetijskih in gozdarskih rabah tal za potrebe poročanja o nacionalni bilanci ogljika, ki postavlja temelje sistemu monitoringa vsebnosti talne organske snovi (TOS) za potrebe poročanja emisij in ponorov toplogrednih plinov v sektorju LULUCF in za oceno stanja kakovosti kmetijskih tal.

Oddelek za kmetijsko ekologijo in naravne vire poleg strokovnih nalog in nacionalnih projektov neposredno vodi ali sodeluje v številnih evropskih projektih. V letu 2019 smo tako izvajali projekte s področja ekološke povezljivosti v kmetijskem in naravnih ekosistemih (ALPBIONET2030). Pomemben del aktivnosti smo

system of model farms that will contribute to systematic monitoring of the impacts of agriculture on the environment, the economic efficiency of production, the effects of agricultural subsidies, and the competitiveness of agricultural holdings. We acquired crucial data on soil carbon stocks (humus content) in the CRP project Monitoring carbon stocks in agricultural and forest soils for reporting on the national carbon balance, which provides the foundation of a system for monitoring soil organic matter (SOM) to report on greenhouse gas emissions and sinks in the LULUCF sector and for estimating the quality of agricultural soil.

Aside from performing expert tasks and implementing national projects, the department acts as the lead or a research partner in multiple European projects. In 2019 we carried out projects concerning ecological connectivity in agricultural and natural ecosystems (ALPBIONET2030). A significant portion of the department's activities was



Meritve sposobnosti tal za absorpcijo vode
Measurements of water absorption capacity of soil

izvajali v projektu Links4Soils EU programa Alpine Space, v katerem smo štiri leta vodili skupino inštitucij šestih alpskih držav in ustvarjali znanja o tleh alpskega območja. Rezultati projekta naj bi pripomogla k dvigu zavedanj o pomenu tal, izboljšanju trajnostnega upravljanja ekosistemov, ohranjanju ekosistemskih storitev tal in trajnostni rabi tal v Alpah. V znanstvenem H2020 projektu Perceptive Sentinel, ki ga vodil slovenski Sinergise d.o.o., smo sodelovali pri izdelavi namenskih aplikacij uporabe podatkov EU satelitskega sistema Sentinel v kmetijstvu. V okviru EU projekta GROW observatory smo validirali satelitske zaznave vlage v kmetijskih tleh s približno 380 senzorji na področju celotne Slovenije.

Poleg navedenih aktivnosti smo na Oddelku za kmetijsko ekologijo in naravne vire opravili števila strokovna svetovanja s področja vzorčenja in analize tal, gnojenja, onesnaženosti tal in ostalih naravnih virov ter okoljsko neobremenjujoče rabe fitofarmaceutskih sredstev.

dedicated to the project Links4Soils in the framework of the EU programme Alpine Space, in which we lead a group of twelve partners from six Alpine countries for four years in creating know-how regarding the soils of the Alpine area. The project results are expected to increase soil awareness, improve the sustainable management of ecosystems, preserve the ecosystem services of soil, and nurture the sustainable use of soil in the Alps. In the H2020 project Perceptive sentinel, which was coordinated by the Slovenian firm Sinergise, we collaborated in the design of purpose-built applications for the EU satellite system Sentinel data exploitation in agriculture. In the framework of the project GROW observatory, we validated satellite-based sensing of humidity in agricultural soil with approximately 380 sensors located across Slovenia.

Additionally, the department held numerous advisory meetings concerning soil sampling and analysis, the pollution of soil and other natural resources, and the sustainable use of pesticides.

Centralni laboratorij



Central Laboratories

Predstojnik / Head of department

dr. / Dr Dejan Bavčar

Centralni laboratorij Kmetijskega inštituta Slovenije je vodilni laboratorij na področju agrokemije in enologije v Sloveniji. Od leta 2012 je akreditiran pri Slovenski akreditaciji (številka akreditacije LP-020) na področju preskušanja. Sodelujemo v mednarodnih medlaboratorijskih primerjalnih shemah BIPEA, EUPT, CIPAC in WEPAL-ISE ter programih za ugotavljanje usposobljenosti.

Centralni laboratorij je razdeljen na Agrokemijski laboratorij in Enološki laboratorij. V Agrokemijskem laboratoriju izvajamo analize tal, medu in drugih prehranskih izdelkov, analize krme, gnojil, sredstev za varstvo rastlin in onesnaževal. V Enološkem izvajamo analize in senzorično ocenjevanje vina ter analize žganih pijač.

The Central Laboratories of the Agricultural Institute of Slovenia are the leading agricultural chemistry and oenology laboratory in Slovenia. They have been accredited for testing by Slovenian Accreditation (accreditation No. LP-020) since 2012. The Central Laboratories collaborate in the international inter-laboratory comparative schemes BIPEA, EUPT, CIPAC, and WEPAL-ISE, and in test performance programmes.

The Central Laboratories comprise the Agrochemical Laboratory, which performs analyses of soil, honey, and other food products, feedstuff, fertiliser, pesticides, and pollutants, and the Oenological Laboratory, where analyses and sensory testing of wine and analyses of spirits are carried out.

RAZISKOVALNO DELO

- Raziskave aromatičnih spojin vina
- Raziskave ostankov fitofarmacevtskih sredstev

RESEARCH

- Research into aromatic compounds in wine
- Research into pesticide residue

STROKOVNO DELO IN STORITVE

- Kemijske analize za potrebe inšpekcijskega nadzora kakovosti mineralnih gnojil in za izvajanje določenih nalog javne službe na področju fitofarmacevtskih sredstev
- Analize ostankov pesticidov na sadju, zelenjavi, v vinu, tleh in medu
- Analize medu
- Analize vina
- Analize tal
- Analize krme
- Analize gnojil
- Analize fitofarmacevtskih sredstev
- Analize žganih pijač

EXPERT WORK AND SERVICES

- Chemical analysis for inspections of the quality of mineral fertilisers and for certain public services concerning plant protection products
- Analysis of pesticide residue in fruit, vegetables, wine, soil, and honey
- Honey analysis
- Wine analysis
- Soil analysis
- Feedstuff analysis
- Fertiliser analysis
- Plant protection products analyses
- Analysis of spirits

2019

Centralni laboratorij je v letu 2019 objavil 5 znanstvenih člankov s področja ostankov fitofarmacevtskih sredstev in veterinarskih zdravil v medu, aromatičnih spojin in proantocianidinov v vinu, ter nitratov in nitritov v zelenjavi. Raziskovalno delo smo izvajali samostojno ali v povezavi z Oddelkom za sadjarstvo, vinogradništvo in vinarstvo Kmetijskega inštituta Slovenije, z Biotehniško fakulteto v Ljubljani, z Inštitutom za kmetijstvo in turizem v Poreču, ter s Fakulteto za tehnologijo hrane in biotehnologijo v Zagrebu. Pri raziskovalnem delu smo bili vključeni v projekte drugih oddelkov Kmetijskega inštituta Slovenije in v delo programske skupine Trajnostno kmetijstvo.

Centralni laboratorij s svojim strokovnim delom nudi podporo predvsem Ministrstvu za kmetijstvo, gozdarstvo in prehrano. V letu 2019 smo v okviru strokovne naloge Ocenjevanje fitofarmacevtskih sredstev sodelovali pri registraciji fitofarmacevtskih sredstev v Sloveniji in Evropski uniji ter za Evropsko unijo ocenjevali aktivne snovi tritosulfuron, giberelini in giberelinsko kislino na področjih: fizikalno-kemijske lastnosti in analize metode, ekotoksikologija, obnašanje v okolju, ter ostanki. Z Ministrstvom za kmetijstvo, gozdarstvo in prehrano sodelujemo tudi z izvajanjem analiz različnih matrik v okviru strokovnih nalog: Strokovna naloga o izvajanju dejavnosti analiz uradnih vzorcev krme, Strokovna naloga laboratorijske analize vzorcev FFS in dodelanega semena, ali tržnih analiz kot so analize mineralnih, organsko-mineralnih ter organskih gnojil in enoloških sredstev. Za Ministrstvo za kmetijstvo, gozdarstvo in prehrano smo izvedli tudi analize ostankov akaricidov v medu v okviru programa kontrole medu v letu 2019.

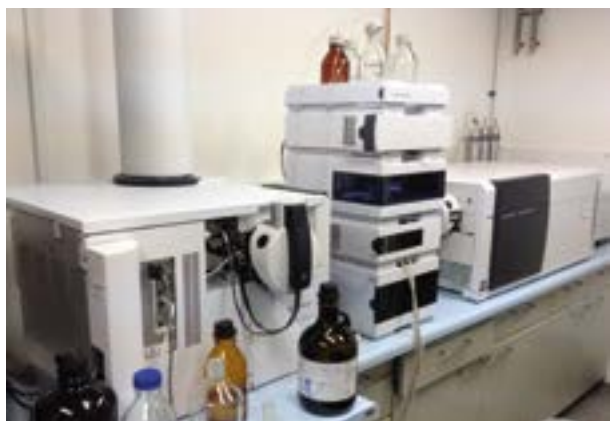
V letu 2019 smo sodelovali tudi z Ministrstvom za zdravje. V okviru skupine ocenjevalcev, ki jo je formiral Urad za kemikalije, izvajamo Strokovno nalogo ocenjevanja snovi in biocidnih proizvodov.

2019

In 2019, The Central Laboratories published five scientific papers on pesticide and veterinary drug residues in honey, aromatic compounds and proanthocyanidins in wine, and nitrates and nitrites in vegetables. The research was conducted independently or in association with the AIS's Department of Fruit Growing, Viticulture, and Oenology, the Biotechnical Faculty in Ljubljana, the Institute for Agriculture and Tourism in Poreč, and the Faculty of Food Technology and Biotechnology in Zagreb. We were involved in the research projects of other departments at the AIS and the work of the Sustainable Agriculture programme group.

The Central Laboratories provide expert support in particular to the Ministry of Agriculture, Forestry and Food. In 2019, as part of the expert task Evaluation of plant protection products, we worked on the authorisation of plant protection products in Slovenia and the European Union, and, for the European Union, analysed the following properties of the active ingredients tritosulfuron, gibberellins, and gibberellic acid: the physical and chemical properties and methods of analysis, ecotoxicology, impact on the environment, and residue. We also collaborate with the Ministry in performing analyses of various matrices in the framework of the expert tasks: Expert task of Analysis of official feedstuff samples and Expert task of Laboratory analysis of samples of plant protection products and treated seeds, and in market analyses of mineral, organic-mineral, and organic fertiliser and oenological products. Another task we completed for the Ministry in 2019 was an analysis of acaricide residue in the framework of the honey control programme.

In 2019 we also collaborated with the Ministry of Health: as part of a group of evaluators appointed by the Bureau for chemicals, we carried out the expert task Evaluation of substances and biocide products.



Tekočinski kromatograf sklopljen s tandemskim
in TOF masnim spektrometrom
*Liquid chromatograph coupled with tandem
and TOF mass spectrometer*

Centralni laboratorij je v letu 2019 izvajal analize za druge oddelke Kmetijskega inštituta Slovenije. Sodelovali smo pri nalogah Oddelka za kmetijsko ekologijo in naravne vire pri analizah rodovitnosti tal in vsebnosti nevarnih snovi v tleh in pridelkih na vodovarstvenih območjih v mestni občini Ljubljana ter na območju vodarne Brest pri Igu, ki jih je financirala Mestna občina Ljubljana. Ravno tako smo sodelovali tudi z Oddelkom za poljedelstvo, vrtnarstvo, genetiko in žlahtnjenje z analizami žit v okviru Strokovne naloge Registracije sort rastlin ter semenarstva.

Tržne analize Centralnega laboratorija so zajemale predvsem analize tal za potrebe pridobivanja subvencij kmetovalcev ter izdelavo gnojilnih nasvetov za kmetovalce. Z analizami tal se na nas obračajo tudi podjetja (Talum, Ikema ter RTCZ). Na področju krme so tržne analize potrebovali predvsem živinorejci, in sicer za izvajanje optimalnega krmljenja rejnih živali. Na področju medu so naše analize potrebovali certifikacijski organi (Bureau Veritas, Inštitut KON-CERT Maribor, Inštitut za kontrolo in certifikacijo Univerze v Mariboru), trgovske verige in slovenski pridelovalci. Fitofarmcevska sredstva smo na vsebnost aktivnih snovi analizirali za podjetje Syngenta in Agroavant.

The Central Laboratories conducted analyses for other AIS departments as well. We worked with the Department of Agricultural Ecology and Natural Resources in analyses of soil fertility and the presence of hazardous substances in soil and agricultural products in water protection areas in the Ljubljana Urban Municipality and the area covered by the Brest water treatment facility near Ig, which were financed by the municipality. For the Crop Science Department, we analysed cereals for the Expert task Registration of plant varieties, and seed science.

Market analyses performed by the Central Laboratories included mostly soil analyses required for agricultural subsidies, and the creation of fertilisation advices for farmers. We also performed soil analyses for companies, including Talum, Ikema, and RTCZ. Demand for commercial analysis of feedstuff came in particular from cattle producers who sought optimal feeding plans for their livestock. In the honey segment, our analyses were commissioned by certification authorities (Bureau Veritas, the Institute for Inspection and Certification in Agriculture and Silviculture, Maribor, the Institute for Inspection and Certification of the University of Maribor), retail chains, and Slovenian producers. We analysed the presence of active ingredients in plant protection products for companies such as Syngenta and Agroavant.



Preverjanje vsebnosti kovin v vinih
Checking the metal content of wines



Centrifugiranje vzorcev
Centrifugation of samples

V Enološkem laboratoriju smo kot pooblaščen organizacija za ocenjevanje mošta, vina in drugih proizvodov iz grozdja izdajali odločbe za promet z vinom v Sloveniji in dokumente za njegov izvoz. Z doseženim številom izdanih odločb smo presegli načrte za leto 2019, prav tako smo se z analitskim delom vključevali v nacionalne in mednarodne projekte (Enotur, Agrotur 2, Acquavitis). Kot pooblaščen organizacija za ugotavljanje skladnosti žganih pijač glede kakovosti v okviru uradnega nadzora smo izdajali poročila o skladnosti žganih pijač z veljavno evropsko in slovensko zakonodajo ter poročila o skladnosti za žgane pijače z geografsko označbo. Tudi na tem področju smo presegli načrte, a skupno število analiziranih žganih pijač vseeno ostaja majhno zaradi posebnosti zakonodaje.

The Oenological Laboratory, as an authorised organisation for evaluating wine and other products made of grapes and wine, issued certificates for wine trade in Slovenia and documents for exports. The number of issued decisions exceeded plans for 2019. The laboratory also contributed analytical services to national and international projects (Enotur, Agrotur 2, Acquavitis). As the authorised organisation to assess the conformity of the quality of spirit drinks for official inspection, we issued spirit certificates of compliance with applicable European and Slovenian regulations and reports on the compliance of spirits with geographical indications. Plans in this segment were exceeded, but the overall number of analysed spirits remains low due to regulatory particularities.

Slovenska čebelarska akademija



*Beekeeping Academy
of Slovenia*

Predstojnica / Head of department
Damjana Grobelšek

Slovensko čebelarstvo akademijo (SČA) opredeljuje Zakon o kmetijstvu. Ustanovljena je bila leta 2018 kot oddelek Kmetijskega inštituta Slovenije in je namenjena neformalnemu izobraževanju s področja čebelarstva.

Akademija ponuja inovativen, problemsko osredotočen pristop k izobraževanju po principu PBE (*problem based education*), ki spodbuja kandidate h kreativnemu mišljenju, upošteva predhodne izkušnje in ponuja ciljno usmerjene lekcije. Cilji so: izboljšanje znanja na področju čebelarstva v mednarodnem prostoru, povečanje promocije Slovenije, slovenskega čebelarstva in turizma, izboljšanje zaposlitvene možnosti ter ozaveščenost o pomenu oprave. S tem namenom SČA organizira in izvaja izobraževanja na področju čebelarstva za tuje in domače zainteresirane odjemalce, države v razvoju in izvajalce izobraževanj ter skrbi za skupno promocijo izobraževalnih ustanov s področja čebelarstva in širjenje novih znanj v nacionalnem in mednarodnem okviru.

2019

Ugotovitve analize interesa tujine po čebelarskem znanju, ki so jo za SČA izvedla diplomatska in konzularna predstavništva Ministrstva za zunanje zadeve, so pokazale, da je veliko zanimanje ravno na področju projektov v tretjih državah. Zato smo ob podpori Ministrstva za kmetijstvo, gozdarstvo in prehrano v letu 2019 izvedli izbor in usposabljanja čebelarskih inštruktorjev, ki bodo kot mentorji izvajali projekte SČA za tujce. Izšel je prvi katalog s programi SČA za zainteresirane odjemalce. Leto 2019 je bilo med drugim tudi v znamenju promocije bogatega slovenskega znanja s področja čebelarstva v tujini in izvedbi prvih izobraževanj po specialnih modulih SČA za tujce.

The Beekeeping Academy of Slovenia (BAS), established as part of the Agricultural Institute of Slovenia in 2018 under the Agriculture Act, is dedicated to informal education on beekeeping.

It offers an innovative, problem-based (PBE) approach to education that encourages candidates to engage in creative thinking, makes allowances for past experience, and provides targeted lessons. Its goals are to improve knowledge of beekeeping in the international arena; to help promote Slovenia, Slovenian beekeeping, and tourism; to improve employment opportunities; and to raise awareness of the importance of pollination. Bearing in mind these goals, the Academy offers beekeeping training courses for foreign and domestic stakeholders, developing countries, and instructors, assists in the joint promotion of educational institutions that provide beekeeping courses, and helps disseminate new know-how domestically and internationally.

2019

An analysis of foreign demand for beekeeping know-how conducted for the Academy by the Slovenian network of diplomatic and consular missions has shown that there is great demand for projects in third countries. With the support of the Ministry of Agriculture, Forestry and Food, we therefore selected and trained beekeeping instructors who will mentor the Academy's projects for foreigners. The first catalogue with BAS programmes for prospective trainees was published. Another major area of activity in 2019 was the promotion of the wealth of Slovenian beekeeping know-how abroad and completion of the first training courses under special modules for foreigners.



Panjske končnice – slovenska posebnost
Beehive panels - Slovenian specialty

Z namenom razvoja povezav in priložnosti za mednarodno sodelovanje smo se udeležili simpozija Apimondia v Rimu, kongresa v Montrealu z organizacijo in izvedbo Slovenskega dne za strokovno in širšo čebelarstvo javnost ter nemško-slovenske delavnice »Čebele in kmetijstvo« v Berlinu. SČA je za FAO predstavila možnost opolnomočenja ranljivejših socialnih skupin ter žensk preko čebelarskih projektov.

V aprilu smo organizirali konferenco, ki je bila namenjena obeležitvi prve obletnice ustanovitve SČA in obravnavi aktualnih vprašanj slovenskega čebelarstva, ki je od razglasitve Svetovnega dneva čebel v središču svetovne pozornosti. Z namenom promocije je bila izvedena javnosti odprta seja Programskega odbora SČA v sklopu Kmetijsko-živilskega sejma AGRA na čebelarski dan. Na odprti seji z mednarodno udeležbo so poslušalci aktivno sodelovali ter dobili vpogled v namen in delovanje SČA. Sodelovali smo na Api Slovenija, ki predstavlja enega največjih strokovnih čebelarskih dogodkov v EU.

Na povabilo Ministrstva za zunanje zadeve (MZZ) smo pripravili del programa mednarodnega Dneva Afrike. Na dogodku so bili predstavljeni programi SČA za države v razvoju. Zaradi izkazanega interesa smo pripravili predloge projektov s potujočimi čebelarskimi inštruktorji za države v razvoju (Etiopijo, Kraljevino Butan in Gano). V začetku prve čebelarske sezone se je usposabljanja s področja Splošnega čebelarjenja po programu SČA udeležil predstavnik Južne Koreje, junija pa smo

In order to develop connections and opportunities for international cooperation, we attended the Apimondia symposium in Rome, the congress in Montreal, which featured a Slovenian Day for the expert and general public, and the German-Slovenian workshop Bees and Agriculture in Berlin. We presented to the FAO possibilities for empowering vulnerable social groups and women through beekeeping projects.

In April we organised a conference that marked the first anniversary of the Academy's founding and dealt with the most topical issues concerning Slovenian beekeeping; since the declaration of World Bee Day, Slovenian beekeeping has been in the global spotlight. At the AGRA fair, an open session of the BAS programme committee was held on Beekeeping Day for promotional purposes. The session, which featured international guests, involved visitors actively participating and gaining insight into the Academy's mission and activities. We also participated in Api Slovenija, one of the biggest professional events for beekeeping in the EU.

At the invitation of the Ministry of Foreign Affairs, we organised a segment of the Africa Day programme at which we presented the BAS's activities for developing countries. Due to expressions of interest, we prepared proposals for projects with travelling beekeeping instructors for developing countries (Ethiopia, the Kingdom of Bhutan, and Ghana). At the onset of the first beekeeping season, a South Korean participant attended the BAS course on general beekeeping,



Sodelovanje s čebelarji invalidi v Sloveniji
Collaboration with disabled beekeepers in Slovenia

izvedli izobraževanje za zainteresirane odjemalce po specialnem modulu Vzreja matic za 20 udeležencev. Po PBE programih se je 170 ur usposabljal bangladeški predstavnik, ki sodeluje v projektu v partnerstva BRAC - Bangladeš, Medex in KIS. V letu 2019 je bilo tako skupaj izdanih 45 potrdil o izobraževanju po programih SČA, od tega 22 za zainteresirane odjemalce in 23 za izvajalce.

V letu 2019 se je končal projekt izmenjave znanja na Novi Zelandiji, ki ga je SČA pričela ob ustanovitvi leta 2018. Konec 2019 je nastala zasnova sodelovanja Slovenije z Etiopijo in osnutek prvega obiska na pobudo MZZ.

Za naročnika ITF – Ustanove za krepitev človekove varnosti smo pripravili koncept projekta, ki omogoča opolnomočenje žrtev min v BiH preko čebelarjenja. Projekt je zasnovan kot dvoletno praktično sodelovanje med čebelarji invalidi iz Slovenije, SČA in organizacijo ITF.



Širjenje slovenskega znanja v države v razvoju
Dissemination of Slovenian knowledge in developing countries

and in June we completed a course with 20 participants in the special module Queen Bee Breeding. A Bangladeshi participant who collaborates in the BRAC partnership (Bangladesh, Medex, and AIS) completed a 170-hour PBE course. Overall, we issued 45 BAS training certificates in 2019, of which 22 for end users and 23 for instructors.

An exchange project in New Zealand that the Academy launched upon its founding in 2018 was completed in 2019. A new concept of cooperation between Slovenia and Ethiopia was created at the end of the year and plans were made for the first visit at the initiative of the Ministry of Foreign Affairs.

We devised the concept of a project for empowering mine victims through beekeeping in Bosnia and Herzegovina for the client, ITF – Enhancing Human Security. The project is designed as a two-year practical collaboration between disabled beekeepers in Slovenia, the BAS, and ITF.



Služba za uradno potrjevanje semenskega in sadilnega materiala kmetijskih rastlin



*The Service for Official
Certification of Seed and
Plant Propagation
Material of
Agricultural Plants*

Predstojnik / Head of department

Mag. / MSc Boris Koruza

Služba za uradno potrjevanje je samostojna enota, ki deluje neodvisno od ostalih aktivnosti Kmetijskega inštituta Slovenije. Razdeljena je na dva dela: uradno potrjevanje semenskega in sadilnega materiala kmetijskih rastlin ter semenski laboratorij, ki deloma opravlja naloge s področja uradnega potrjevanja, deloma pa servisne storitve (npr. analize semen in pelodne analize) za zunanje naročnike. Semenski laboratorij deluje znotraj mednarodne zveze za kontrolo kakovosti semen – ISTA (International Seed Testing Association) in je v marcu 2019 uspešno opravil obnovitveno akreditacijo za naslednja tri leta (ISTA akreditacijski standard in SIST EN ISO/IEC 17025). Nadzor nad njegovim delom redno opravlja tudi Uprava za varno hrano, veterinarstvo in varstvo rastlin RS.

The Service for Official Certification is a separate department, independent of other AIS activities. It has two units: the service for official certification of seed and plant propagation material of agricultural products, and a Seed Laboratory, which performs official certification activities and commercial activities (e.g. analysis of seeds and pollen) for external clients. The Seed Laboratory is a member of the International Seed Testing Association (ISTA) and in March 2019 successfully renewed its accreditation for the next three years (ISTA standard and SIST EN ISO/IEC 17025 standard). It is also regularly inspected by the Administration of the Republic of Slovenia for Food Safety, Veterinary and Plant Protection.

URADNO POTRJEVANJE KMETIJSKIH RASTLIN

Semenski in sadilni material

- Poljščine: žita, krompir, krmne rastline, oljnice, predivnice
- Zelenjadnice

Material za vegetativno razmnoževanje

- Trta
- Sadne rastline
- Hmelj

Zdravstveni pregledi v okviru programov preiskav škodljivih organizmov.

OFFICIAL CERTIFICATION OF AGRICULTURAL PLANTS

Seed and propagation material

- Field crops: cereals, potato, fodder plants, oil plants, and fibre plants
- Vegetables

Material for vegetative propagation

- Grapevine
- Fruit plants
- Hops

Health checks in the framework of pest examination programmes.

SEMENSKI LABORATORIJ

Vzorčenje in analize semen za potrebe

- Uradnega potrjevanja
- Naknadne kontrole
- Inšpekcijsko odvzetih vzorcev semena pri nadzoru trga
- Izvoza izven držav EU
- Hranjenja standardnih vzorcev semena
- Genske banke itd.

SEED LABORATORY

Sampling and analysis of seeds for

- Official certification
- Post-controls
- Inspection of seed samples in market surveillance
- Exports outside the EU
- Storage of standard seed samples
- Gene banks
- Other

Akreditirani postopki dela

- Vzorčenje semena
- Vlaga semena
- Čistota semena
- Kalivost semena
- Seme drugih vrst rastlin v povprečnem vzorcu
- Absolutna masa (masa 1000 semen)
- Biokemični test vitalnosti semena (tetrazol test)

Neakreditirani postopki dela

- Kalibriranje semena s siti (določitev frakcij)
- Hladni test (stresni test za seme koruze pri nizki temperaturi in visoki vlagi)
- Hektolitrska masa
- Padajoče število (falling number)
- Primesi v vzorcih semen za krmo ali mlevsko industrijo

Accredited procedures

- Seed sampling
- Moisture content
- Purity
- Germination
- Determination of other seeds by number
- Weight of 1.000 seeds
- Biochemical test of seed viability (tetrazolium test)

Non-accredited procedures

- Calibration of seeds with sieves (separation of fractions)
- Cold test (stress test for maize seeds at low temperature and high humidity)
- Hectolitre mass
- Falling number
- Foreign matter in seed samples for feedstuff or the milling industry

2019

Služba za uradno potrjevanje (SUP) se je v letu 2019 ukvarjala pretežno z izvajanjem treh strokovnih nalog s področja registracije sort ter semenarstva, vpisa sort kmetijskih rastlin v sortno listo in vodenja sortne liste ter zdravstvenega varstva rastlin.

Hranjenje uradnih standardnih vzorcev semenskega materiala zavarovanih oziroma registriranih sort

V letu 2019 smo nadaljevali s sistemom uradnega hranjenja standardnih vzorcev semena sort poljščin in zelenjadnic, ki so zavarovane in/ali vpisane v slovensko sortno listo in standardnih vzorcev semena sort s Skupnega kataloga sort poljščin in zelenjadnic, ki jih potrebujemo pri izvajanju uradnega potrjevanja, vzporedne in naknadne kontrole semenskega materiala kmetijskih rastlin. Standardni vzorec nam omogoča, da preverimo, ali vzdrževalci sorto vzdržujejo tako, da tekom let ne pride do sprememb lastnosti sorte, in ali je semenski material, ki je dan na trg, identičen sorti, ki je označena na pakiranju semenskega materiala.

2019

The Official Certification Service dealt mostly with expert tasks concerning the certification of varieties and seed science, the entry of crop varieties in the list of varieties, management of the list of varieties, and plant health matters.

Storage of official standard samples of seed material of protected and registered varieties

In 2019, we continued with the system of official storage of standard seed samples of varieties that are protected and / or entered in National List of Varieties and standard seed samples of varieties from EU Catalogue needed for official certification, parallel and post controls of agricultural plant seed. The standard sample allows us to check that the maintainers maintain the variety in such a way that the characteristics of the variety do not change over the years and that the seed material placed on the market is identical to the variety marked on the seed packaging.

In 2019 we received 48 official definitive seed samples and 87 standard seed samples for storage. We prepared 288 standard seed samples for the post-control or verification of a variety before entry in the list of varieties, and sent

Matična drevesa koščičastih sadnih vrst
za pridelavo certificiranih cepičev
Certified mother trees of stone fruits



V letu 2019 smo v hrambo prejeli 48 malih in 87 velikih standardnih vzorcev. Za potrebe naknadne kontrole ali preverjanja sorte ob vpisu v sortno listo smo pripravili 288 standardnih vzorcev, tujim sortnim uradom pa smo na njihovo prošnjo poslali 10 standardnih vzorcev ter en opis sorte. Trenutno hranimo skupno 2.087 vzorcev (982 VSV in 1.105 MSV).

Uradno potrjevanje semena ter razmnoževalnega in sadilnega materiala kmetijskih rastlin

Uradno potrjevanje semenskega materiala poljščin in zelenjadnic ter razmnoževalnega materiala trte, sadnih rastlin in hmelja je strokovna naloga po javnem pooblastilu organa za potrjevanje ter vodenje postopka uradne potrditve semenskega materiala kmetijskih rastlin, in sicer za semena žit, oljnic in predivnic, krmnih rastlin in pese ter zelenjadnic, semenskega krompirja, razmnoževalnega materiala in sadik sadnih rastlin, materiala za vegetativno razmnoževanje trte ter razmnoževalnega materiala in sadik hmelja.

Sestavni del postopkov uradnega potrjevanja semena kmetijskih rastlin je tudi analitika semen, ki se izvaja v semenskem laboratoriju. Služba za uradno potrjevanje

10 standard samples and one description of a variety to foreign varietal offices at their request. We currently store 2,087 samples (982 standard seed samples and 1,105 official definitive seed samples).

Official certification of crop seeds, propagation material, and material for vegetative propagation

Official certification of field crop and vegetable seed material and the propagation material of grapevine, fruit plants, and hops is an expert task regarding which the Service for Official Certification is the official certifying authority for the certification and management of certification procedures for these agricultural seeds: cereals, oil and fibre plants, fodder plants and beets, vegetables, seed potato, propagation material and seedlings of fruit plants, material for vegetative propagation of grapevine, and propagation material and seedlings of hops.

An integral part of the official certification procedures for agricultural seeds is seed analytics, which is carried out at the Service's Seed Laboratory. The Service also provides expert support to the Administration of the Republic of Slovenia for Food Safety, Veterinary and Plant Protection and competent inspector services



Posevek semenske koruze – ženska (moško sterilna) ter moška
linija z metlicami
Maize hybrid seed production (female and male parent lines)

nudi strokovno podporo UVHVVR in pristojnim inšpekcijskim službam ter za njihove potrebe pripravlja strokovna mnenja in zbira tehnične podatke. V letu 2019 smo imeli v uradnem potrjevanju poljščin 1.362,59 ha prijavljenih površin oziroma 1.300,63 ha potrjenih površin. Skupni uradno potrjeni pridelek poljščin je bil 7.538 ton (v letu 2018 6.072 ton), za kar smo izdali 654.965 uradnih etiket (RPL) (v letu 2018 495.031 uradnih etiket). V uradnem potrjevanju trte, sadnih rastlin in hmelja smo imeli 6 milijonov podlag in 5 milijonov cepičev, izdali pa smo 93.695 uradnih etiket (RPL). Tako v letu 2019 beležimo za vse kmetijske rastline 1.524,59 ha prijavljenih površin oziroma 1.300,63 potrjenih površin in skupaj 748.660 izdanih uradnih etiket (RPL).

Naknadna kontrola certificiranega semenskega materiala kmetijskih rastlin

Z naknadno kontrolo v sortnih poskusih oziroma z laboratorijskimi testi preverjamo sortno ali vrstno pristnost in čistost, zdravstveno stanje ter izpolnjevanje drugih zahtev glede kakovosti semenskega materiala kmetijskih rastlin. V naknadno kontrolo je bilo v letu 2019 vključenih skupaj 297 vzorcev oljnic, krmnih



Določanje absolutne mase pri koruzi
The determination of weight of 1,000 corn seeds

by issuing expert opinions and collecting technical data for them. In 2019 we had 1,362.5h ha of seed growing areas for certification and 1,300.63 ha of officially certified seed growing areas. Total officially certified crop output was 7,538 tonnes (2018: 6,072 tonnes), for which we issued 654,965 official labels (plant passports) (2018: 495,031 official labels). We had 6 million graft rootstocks and 5 million grafts of grapevine, fruit plants, and hops in official certification, and issued 93,695 plant passports. For all crop plants, we had a total of 1,524.59 ha of seed growing areas for certification and 1,300.64 officially certified seed growing areas, and a total of 748,660 issued plant passports.

Post-control of certified agricultural seeds

In post-control, we conduct field trials and/or laboratory tests to determine varietal identity and purity, health condition, and compliance with other conditions concerning the quality of the seed and plant material of agricultural plants. In 2019, post-control involved 279 samples of oil and fodder plants, winter and spring cereals, maize, potato, and vegetables, of which 172 official certification samples and 125 inspectorial and other samples.

Tetrazol test

Tetrazolium test



rastlin, ozimnih in jarih strnih žit, koruze, krompirja in zelenjadnic, od tega 172 vzorcev uradnega potrjevanja ter 125 inšpekcijskih in drugih vzorcev.

Določanje kakovosti semenskega materiala in ISTA-akreditacija semenskega laboratorija

Zapotrebe kontrole kakovosti dela semenskega laboratorija, ki je akreditiran s strani mednarodne organizacije ISTA, smo v sklopu rednega letnega preverjanja v letu 2019 od ISTA prejeli 9 rednih vzorcev semen, na katerih smo opravili 24 zahtevanih analiz. Preverjanje je pokazalo, da so rezultati dela v semenskem laboratoriju dobri in da korektivni ukrepi niso potrebni. Semenski laboratorij je trenutno edini neodvisen, mednarodno priznan in akreditiran laboratorij znotraj mednarodne organizacije ISTA v Republiki Sloveniji.

V letu 2019 je bilo v semenskem laboratoriju sprejetih 2.394 vzorcev semena (0,6 % manj kot v letu 2018), pri katerih je bilo narejenih skupno 4.655 analiz (15 % manj kot v letu 2018).

Determining the quality of seed material and the ISTA accreditation of the Seed Laboratory

To control the quality of seed potato that has been certified by the International Seed Testing Association (ISTA), we received 9 seed samples as part of regular annual verification in 2019 and completed 24 required analyses. The verification showed that the performance of the Seed Laboratory is good and that corrective measures are not required. The Seed Laboratory is currently the only independent, internationally recognised, and ISTA-accredited laboratory in the Republic of Slovenia.

In 2019 our Seed Laboratory received 2,394 seed samples (0.6% less than in 2018), on which it completed a total of 4,655 analyses (15% less than in 2018).

After a long period, we received requests for the analysis of inputs for the milling industry and for feedstuff analysis (10 samples).



Semenski posevek ječmena
Seed production of barley



Bela atipična rastlina fižola v semenskem posevku turškega fižola
White offtype bean plant in runner bean seed production

Po daljšem času smo v letu 2019 zopet prejeli naročila za analize surovin za mlevsko industrijo in analize krme, in sicer za 10 vzorcev krme.

V sklopu skupne akreditacije Centralnega laboratorija za analize medu smo akreditirani tudi za opravljanje pelodne analize. Tako smo v letu 2019 opravili analizo peloda v 61 vzorcih medu in cvetnega prahu. V sklopu mednarodnih primerjalnih analiz BIPEA je bilo opravljenih 5 analiz, ki so potrdile dobro usposobljenost naših analitikov in laboratorija.

Skladno s predpisanimi postopki za uradno potrjevanje smo opravljali uradni nadzor nad vzorčenjem partij semena pri 7 vzorčevalcih podjetij, v katerih je vzorčevalce pod uradnim nadzorom imenovala UVHVVR. Nadzor je bil opravljen pri 5–10 % vzorčenih partij. Za potrebe nadzora je bilo tako vzorčenih 84 partij, ostali kontrolni vzorci pa so bili odvzeti v sklopu izvajanja naknadne kontrole ali uradnega potrjevanja.

As part of the overall accreditation of the AIS Central Laboratories for honey analysis, we are also accredited for pollen analysis. In 2019 we conducted analyses of pollen in 61 samples of honey and pollen. As part of international comparative analyses in the framework of BIPEA, we conducted 5 analyses that confirmed the good performance of our analysts and the laboratory.

In accordance with the prescribed procedures for official certification, we conducted official supervision of the sampling of seed lots by seven official samplers at companies at which the Administration of the Republic of Slovenia for Food Safety, Veterinary and Plant Protection appointed official seed samplers. Supervision was carried out on 5–10% of the sampled seed lots. A total of 84 lots were sampled for supervision purposes and the remaining control samples were taken for the purposes of post-control or official certification.



Pregledni seznami za leto 2019

Lists for 2019

3.1 Zaposleni na dan 31. 12. 2019

Employees as of 31 December 2019

OVR	Oddelek za poljedelstvo, vrtnarstvo, genetiko in žlahtnjenje / <i>Crop Science Department</i>
ICJ	Infrastrukturni center Jabolje / <i>Jabolje Infrastructure Centre</i>
OŽ	Oddelek za živinorejo / <i>Animal Science Department</i>
OSVV	Oddelek za sadjarstvo, vinogradništvo in vinarstvo / <i>Department of Fruit growing, viticulture and oenology</i>
OVR	Oddelek za varstvo rastlin / <i>Plant Protection Department</i>
OKTE	Oddelek za kmetijsko tehniko in energetiko / <i>Department of Agricultural Engineering and Energy</i>
OEK	Oddelek z ekonomiko kmetijstva / <i>Department of Agricultural Economics</i>
OKENV	Oddelek za kmetijsko ekologijo in naravne vire / <i>Department of Agricultural Ecology and Natural Resources</i>
CL	Centralni laboratorij / <i>Central Laboratory</i>
SČA	Slovenska čebelarstva akademija / <i>Beekeeping Academy of Slovenia</i>
SUP	Služba za uradno potrjevanje semenskega in sadilnega materiala kmetijskih rastlin / <i>The Service for Official Certification of Seed and Plant Propagation Material</i>
PP	Projektna pisarna / <i>Project Management Office</i>
PPTZ	Pisarna za prenos tehnologije in znanja / <i>Technology Transfer Office</i>
SS	Skupne službe / <i>Joint Services</i>

Raziskovalci / *Researchers*

dr. DRAGO BABNIK, OŽ
 dr. HELENA BAŠA ČESNIK, CL
 dr. NINA BATOREK LUKAČ, OŽ
 dr. DEJAN BAVČAR, CL
 mag. MATEJ BEDRAČ, OEK
 SARA BELE, OEK
 dr. IRENA BERTONCELJ, OKENV
 JURE BREČKO, OEK
 JERNEJ BUBNIČ, OŽ TOMAŽ CUNDER, OEK
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 izr. prof. dr. MARJETA ČANDEK-POTOKAR, OŽ
 dr. ANKA ČEBULJ, OSVV
 dr. FRANC ČUŠ, OSVV
 dr. PETER DOLNIČAR, OPVGŽ
 dr. BARBARA GERIČ STARE, OVR
 BOŠTJAN GODEC, OSVV
 ANA HITI, OEK

dr. JOŽE HLADNIK, OSVV
 dr. VIKTOR JEJČIČ, OKTE
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 dr. MAJA KOŽAR, OEK
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 JURKA LESJAK, OKENV
 dr. ROBERT LESKOVŠEK, OKENV
 dr. KLEMEN LISJAK, OSVV
 dr. BETKA LOGAR, OŽ
 dr. BRANKO LUKAČ, OPVGŽ
 NEJA MAROLT, OVR

dr. IRENA MAVRIČ PLEŠKO, OVR
 dr. VLADIMIR MEGLIČ, OPVGŽ
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 EVA PRAPROTNIK, OVR
 ANA VOJNOVIČ, OPVGŽ
 POLONA ZABUKOVEC, OSVV

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 SONJA ARHAR, CL
 MOJCA BAŠELJ, ICJ
 ALJOŠA BEBER, OVR
 mag. UROŠ BENEČ, SUP
 JANEZ BERGANT, OKENV
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 NADA BIZJAK, CL
 MONIKA BRVAR, ICJ
 EVA CUKJATI, OŽ
 DANIJELA CVIJIN, ICJ
 MARJETA ČERNE KANC, CL

mag. META ČUFAR, SS
 DANICA DOBROVOLJC, OVR
 SONJA DOLINŠEK, CL
 SONJA DROZDEK ŠINKO, SS
 dr. UROŠ EBERL, OKTE
 MATEJA FORTUNA, SUP
 TADEJ GALIČ, OVR
 MARJAN GALJOT, ICJ
 dr. BLAŽ GERMŠEK, ICJ
 ANTON GJERGEK, OKTE
 JOŽE GLAD, SS in OŽ
 dr. ANTOANETA GOLEMANOVA KUCHAR, PP
 DAMJANA GROBELŠEK, SČA
 BOJANA GROFELNIK, CL
 dr. KATARINA GROS, CL
 BARBARA GRUBAR, OVR
 JOŽE HANČ, SS
 FANIKA HITI, SS
 mag. ANJA HORVAT ALEKSIČ, OŽ
 MARJETA JENE, ICJ
 ALIJANA JERETINA, OŽ
 MATEJ JERMAN, ICJ
 UROŠ KAVKLER, OVR
 NEŽA KERMAVNAR, ICJ
 BENJAMIN KIRN, ICJ
 MIHAEL KLOPČIČ, OŽ
 ROMAN KLOPČIČ, OSVV
 IVA KMETIČ CEGLAR, CL in OSVV
 ANDREJ KOKALJ, SS
 TANJA KOKALJ, OVR
 ELIZABETA KOMATAR, OPVGŽ
 MATEJA KOPAR, ICJ
 mag. BORIS KORUZA, SUP
 TAMARA KOSTEVC, SS
 DAVID KOZAMERNIK, OŽ
 JERNEJA KREGAR, SS
 MARINKA KREGAR, SUP
 TEJA KRPAN, OPVGŽ
 ČRTOMIR KUH, OPVGŽ
 VESNA LOKAR, SUP
 JERNEJ LONČAR, OVR
 BLAŽ MAČEK, ICJ
 LILI MARINČEK, SS
 ROMAN MAVEC, OSVV
 MARKO MECHORA, OVR
 MILAN MIHELČIČ, ICJ
 dr. PETRA MURI, CL
 PRIMOŽ NAKRST, ICJ
 ROMAN NOVAK, ICJ
 ANDREJ OBAL, SUP
 TILLEN OBREZA, ICJ
 BOŠTJAN OGOREVC, ICJ
 IVANA PANTIČ, OPVGŽ

BOŠTJAN PER, ICJ
 TOMAŽ PERPAR, OŽ
 NEŽKA PIRŠ PODJED, ICJ
 ALEŠ PLUT, ICJ
 ALEKSANDRA PODBOJ RONTA, OVR
 IRENA PODGORŠEK, OŽ
 PETER PODGORŠEK, OŽ
 MOJCA POLAK, ICJ
 SNEŽANA POPOVIČ, ICJ
 VALENTINA POVŠE, SS
 mag. MARJETA REBEC, SS
 MAJA REBERNIK, SS
 IVO ROSIČ, ICJ
 MILKO ROSIČ, ICJ
 ANŽE ROVANŠEK, OKENV
 mag. ROMANA RUTAR, SUP
 MIJA SADAR, OŽ
 BOŠTJAN SAJE, OSVV
 TOMAŽ SKET, CL
 JAKOB SMOLNIKAR, OSVV
 ANA SOMRAK GRIMŠIČ, SS
 ŽAN STEGNAR, ICJ
 PETER SUHADOLNIK, SS
 JANEZ SUŠIN, OKENV
 MARJAN ŠINKOVEC, OKENV
 MOJCA ŠKOF, OPVGŽ
 BARBARA ŠKRBINA, SS
 ANTON ŠMIDOVNIK, ICJ
 ANA ŠPILAK, OPVGŽ
 JOŽE ŠUŠTAR, ICJ
 JOŽE ŠUŠTAR (2), ICJ
 dr. LENA TAJNŠEK, SS
 STANE TESTEN, ICJ
 NINA TOMIČ STARC, PPTZ
 MOJCA TRČEK, CL
 MARKO TROBEVŠEK, OSVV
 BENO TROJANŠEK, ICJ
 PRIMOŽ TROŠT, ICJ
 ALEŠ URANKAR, ICJ
 mag. META URBANČIČ ZEMLIJČ, OVR
 SABINA VERBUČ, CL
 DARJA VOUK, SUP
 VIKTOR ZADRGAL, ICJ
 ANDREJ ZEMLJIČ, OPVGŽ
 MILOŠ ŽAGAR, ICJ
 VIKTOR ŽEBOVEC, ICJ
 GAŠPER ŽERJAL, PP
 mag. METKA ŽERJAV, OVR
 mag. ELA ŽILIČ, SS
 DRAGO ŽITEK, SUP
 BERNARDA ŽITKO, CL
 DAMJANA ŽNIDAR, OPVGŽ
 mag. VIDA ŽNIDARŠIČ PONGRAC, CL

3.2 Najpomembnejše objave v letu 2019 (9. 1. 2020)

Top publications in 2019 (as of 9 January 2020)

Izvirni znanstveni članek / Original scientific papers

1. ZADRAŽNIK, Tanja, MOEN, Anders, ŠUŠTAR VOZLIČ, Jelka. *Chloroplast proteins involved in drought stress response in selected cultivars of common bean (Phaseolus vulgaris L.)*. 3 biotech, ISSN 2190-572X. [Print ed.], 2019, vol. 9, no 9, art. no. 331, str. 1-15, doi: 10.1007/s13205-019-1862-x. [COBISS.SI-ID 5841768]
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3. ŠAJNA, Nina, ŠIPEK, Mirjana, ŠUŠTAR VOZLIČ, Jelka, KALIGARIČ, Mitja. *Germination behavior of the extremely rare Hladnikia pastinacifolia Rchb. (Apiaceae) - a Pleistocene in situ survivor*. Acta botanica Croatica : an international journal of botany, ISSN 0365-0588, 2019, vol. 78, no. 2, str. 107-115, ilustr., doi: 10.2478/botcro-2019-0017. [COBISS.SI-ID 24787720]
4. SINKOVIČ, Lovro, ŠKOF, Mojca, UGRINOVIČ, Kristina. *Effect of nitrogen fertilizer rates on physico-chemical characteristics of onion bulbs (Allium cepa L. var. cepa)*. Agrozanje, ISSN 1512-6412, 2019, vol. 20, no. 3, str. 131-140. <http://doisrpska.nub.rs/index.php/agrozanje/article/view/6434/6307>, doi: 10.7251/AGREN1903131S. [COBISS.SI-ID 5948008]
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6. OGOREVC, Jernej, POKLUKAR, Klavdija, DOVČ, Peter. *Establishment and characterization of proliferating primary cultures of equine epidermal keratinocytes*. Animal biotechnology, ISSN 1049-5398, 2019, on line first, ilustr. <https://www.tandfonline.com/doi/full/10.1080/10495398.2019.1687091>, doi: 10.1080/10495398.2019.1687091. [COBISS.SI-ID 4330120]
7. RIBANI, A., UTZERI, Valerio Joe, GERACI, Claudia, TINARELLI, Silvia, DJAN, Mihajla, VELICKOVIC, Nevena, DONEVA, Radostina, DALL'OLIO, Stefania, NANNI COSTA, Leonardo, ŠKRLEP, Martin, ČANDEK-POTOKAR, Marjeta, et al. *Signatures of de-domestication in autochthonous pig breeds and of domestication in wild boar populations from MC1R and NR6A1 allele distribution*. Animal genetics, ISSN 0268-9146, April 2019, vol. 50, iss. 2, str. 166-171. <https://onlinelibrary.wiley.com/doi/full/10.1111/age.12771>, doi: 10.1111/age.12771. [COBISS.SI-ID 5671784]
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10. ŠKRLEP, Martin, TOMAŽIN, Urška, BATOREK LUKAČ, Nina, POKLUKAR, Klavdija, ČANDEK-POTOKAR, Marjeta. *Proteomic profiles of the longissimus muscles of entire male and castrated pigs as related to meat quality*. Animals, ISSN 2076-2615, 2019, vol. 9, no. 3, str. 1-14. <https://www.mdpi.com/2076-2615/9/3/74/htm>, doi: 10.3390/ani9030074. [COBISS.SI-ID 5696104]
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3.3 Projekti

Projects

Projekti iz programa Obzorje 2020 / Horizon 2020 projects and programmes

Nosilec KIS / AIS as coordinator

DIVERSITY OF LOCAL PIG BREEDS AND PRODUCTION SYSTEMS FOR HIGH QUALITY TRADITIONAL PRODUCTS AND SUSTAINABLE PORK CHAINS (TREASURE)

Nosilka projekta: dr. Marjeta Čandek-Potokar; Šifra: 634476; Trajanje: 1. 4. 2015–31. 3. 2019

INCREASING THE EFFICIENCY AND COMPETITIVENESS OF ORGANIC CROP BREEDING (ECOBREED)

Nosilec projekta: dr. Vladimir Meglič; Šifra: 771367; Trajanje: 1. 5. 2018–30. 4. 2023

KIS sodelujoči / AIS as partner

BIG DATA KNOWLEDGE EXTRACTION AND RE-CREATION PLATFORM – SIMPLE APPS (PERCEPTIVE SENTINEL)

Nosilec projekta: SINERGISE, laboratorij za geografske informacijske sisteme, d. o. o.; Nosilec projekta na KIS: dr. Borut Vrščaj; Šifra: 776115; Trajanje: 1. 1. 2018–30. 6. 2020

INTEGRATED WEED MANAGEMENT: PRACTICAL IMPLEMENTATION AND SOLUTIONS FOR EUROPE (IWM PRAISE)

Nosilec projekta: Aarhus University; Nosilec projekta na KIS: dr. Robert Leskovšek; Šifra: 727321; Trajanje: 1. 6. 2017–31. 5. 2022

EXPLOITING THE MULTIFUNCTIONAL POTENTIAL OF BELOWGROUND BIODIVERSITY IN HORTICULTURAL FARMING (EXCALIBUR)

Nosilec projekta: CREA; Nosilec projekta na KIS: dr. Jaka Razinger; Šifra: 817946; Trajanje: 1. 6. 2019–31. 5. 2024

METROFOOD-RI PREPARATORY PHASE PROJECT (METROFOOD-PP)

Nosilec projekta: ENEA; Nosilka projekta na KIS: dr. Helena Baša Česnik; Šifra: 871083; Trajanje: 1. 12. 2019–30. 6. 2022

NEW INDICATORS AND ON-FARM PRACTICES TO IMPROVE HONEYBEE HEALTH IN THE AETHINA TUMIDA ERA IN EUROPE (BPRACTICES)

Nosilec projekta: Istituto zooprofilattico sperimentale del Lazio e della Toscana; Nosilka projekta na KIS: dr. Maja Ivana Smodiš Škertl; Šifra: ERA-NET SusAn 2330-17-000089; Trajanje: 1. 2. 2017–1. 2. 2020

SUSTAINABILITY IN PORK PRODUCTION WITH IMMUNOCASTRATION (SuSi)

Nosilec projekta: University of Hohenheim; Nosilka projekta na KIS: dr. Marjeta Čandek-Potokar; Šifra: ERA-NET SusAn 2330-17-000090; Trajanje: 1. 9. 2017–31. 8. 2020

EXPLOIT BIODIVERSITY IN VITICULTURAL SYSTEMS TO REDUCE PEST DAMAGE AND PESTICIDE USE, AND INCREASE ECOSYSTEMS SERVICES PROVISION (BIOVINE)

Nosilec projekta: Università Cattolica del Sacro Cuore (UCSC); Nosilec projekta na KIS: dr. Saša Širca; Šifra: CORE organic ERA-NET; Trajanje: 1. 3. 2018–28. 2. 2021

PROTECTING THE DIVERSITY OF MEDITERRANEAN VITIS IN A CHANGING ENVIRONMENT (MedVitis)

Nosilec projekta: Hellenic Agricultural Organisation-Demeter; Nosilka projekta na KIS: dr. Barbara Pipan; Šifra: ARIMNet2 ERA-NET; Trajanje: 1. 4. 2018–31. 3. 2021

Nosilec projekta, Nosilka projekta / Project coordinator

Nosilec projekta na KIS, Nosilka projekta na KIS / Project coordinator at AIS

Odgovorni raziskovalec na KIS, Odgovorna raziskovalka na KIS / Responsible researcher at AIS

Program sodelovanja / Cooperation Programme

Sodelujoča organizacija / Partner organization

Šifra / Number

Trajanje / Duration

Projekti, sofinancirani iz evropskih strukturnih in investicijskih skladov

/ *Projects co-financed with European structural and investment funds*

Nosilec KIS / AIS as coordinator

INOVATIVNO PARTNERSTVO ZA RAZVOJ VINOGRADNIŠTVA IN ENOTURIZMA SPODNJE VIPAVSKE DOLINE (ENOTUR)

Program sodelovanja: Operativni program za izvajanje Evropske kohezijske politike v obdobju 2014–2020; Nosilec projekta: dr. Klemen Lisjak; Trajanje: 1. 2. 2018–31. 10. 2020

PROTOTIPIZACIJA GENOTIPSKEGA PRISTOPA PRI SELEKCIJI KRANJSKE ČEBELE (APIS MELLIFERA CARNICA).

Program sodelovanja: Raziskovalci na začetku kariere 2.0. v okviru Operativnega programa za izvajanje Evropske kohezijske politike v obdobju 2014–2020
Odgovorni na KIS: dr. Janez Prešeren; Nosilka na KIS: dr. Ajda Moškrič; Trajanje: 1. 6. 2017–31. 5. 2020

VPLIV GNOJENJA Z DUŠIKOM IN KALCIJEM NA SKLADIŠČENJE TER AROMATSKI PROFIL JAGODE IN AMERIŠKE BOROVNICE

Program sodelovanja: Raziskovalci na začetku kariere 2.0. v okviru Operativnega programa za izvajanje Evropske kohezijske politike v obdobju 2014–2020
Odgovorna na KIS: dr. Darinka Koron; Nosilka na KIS: dr. Nika Weber Cvelbar; Trajanje: 1. 6. 2017–31. 5. 2020

ZAVIRANA OKSIDACIJA MESA PLODOV SORTE 'MAJDA' - NEIZKORIŠČEN POTENCIAL SLOVENSKE SORTE JABOLK IN MOŽNOST NJENE UPORABE V GOSPODARSTVU

Program sodelovanja: Raziskovalci na začetku kariere 2.1. v okviru Operativnega programa za izvajanje Evropske kohezijske politike v obdobju 2014–2020
Odgovorni na KIS: dr. Matej Stopar; Nosilka na KIS: dr. Anka Čebulj; Trajanje: 1. 5. 2019–31. 3. 2022

VPELJAVA PRIDELAVE OHRANJEVALNIH SEMENSKIH MEŠANIC ZA OBNOVO DEGRADIRANE TRAVNE RUŠE NA OBMOČJU ŠPORTNEGA CENTRA POKLJUKA

Program sodelovanja: PRP – ukrep Sodelovanje

Nosilec projekta: dr. Vladimir Meglič; Trajanje: 19. 10. 2019–18. 10. 2021

KIS sodelujoči / AIS as partner

FUNKCIONALNA ŽVILA PRIHODNOSTI (F4F)

Program sodelovanja: Operativni program za izvajanje Evropske kohezijske politike v obdobju 2014–2020

Nosilka projekta RRP: dr. Mateja Modic; Nosilec projekta na KIS: dr. Jože Verbič; Šifra: C3330-16-529005; Trajanje: 1. 9. 2016–30. 6. 2020

KONZORCIJ ZA PRENOS TEHNOLOGIJ IZ JRO V GOSPODARSTVO (KTT)

Program sodelovanja: Operativni program za izvajanje Evropske kohezijske politike v obdobju 2014–2020

Nosilec projekta: Institut »Jožef Stefan«; Nosilka projekta na KIS: Nina Tomić Starc; Šifra: C3330-17-529040; Trajanje: 1. 9. 2017–30. 6. 2022

RAZVOJ RAZISKOVALNE INFRASTRUKTURE ZA MEDNARODNO KONKURENČNOST SLOVENSKEGA RRI PROSTORA – RI-SI-2 – ELIXIR-SI

Nosilka projekta: UL; Nosilka projekta na KIS: dr. Barbara Gerič Stare; Trajanje: 1. 6. 2019–31. 8. 2021

KONTROLIRANO KRMLJENJE KORUŽNE SILAŽE V OBROKIH GOVEDI

Nosilec projekta: KGZS – KGZ Novo mesto; Nosilec projekta na KIS: dr. Tomaž Žnidaršič; Trajanje: 1. 1. 2019–31. 12. 2021

SENEO MESO IN MLEKO

Nosilec projekta: Boštjan Kosec; Nosilec projekta na KIS: dr. Jože Verbič; Trajanje: 1. 1. 2019–31. 12. 2021

PITANJE GOVEDI ZA PRIREJO GOVEDINE VRHUNSKE KAKOVOSTI

Nosilec projekta: dr. Matjaž Červak (Emona, Razvojni center za prehrano); Nosilec projekta na KIS: dr. Tomaž Žnidaršič; Trajanje: 1. 1. 2019–31. 12. 2021

ZRNATE STROČNICE-PRIDELAVA, PREDELAVA IN UPORABA

Nosilec projekta: mag. Manfred Jakop (UM-FKBV); Nosilca projekta na KIS: dr. Aleš Kolmanič in dr. Jože Verbič; Trajanje: 1. 1. 2019–31. 12. 2021

IZBOLJŠANE TEHNOLOGIJE PRIDELAVE IN KONZERVIRANJA Z BELJAKOVINAMI BOGATE KRME – METULJNICE IN NJIHOVE MEŠANICE ZA PRILAGAJANJE PODNEBNIM SPREMEMBAM

Nosilec projekta: dr. Branko Kramberger (UM-FKBV); Nosilec projekta na KIS: dr. Jože Verbič; Trajanje: 1. 1. 2019–31. 12. 2021

SADJARJI ZA OPRAŠEVANJE IN OPRAŠEVALCI ZA SADJARJA

Nosilec projekta: dr. Danilo Bevk, NIB; Nosilca projekta na KIS: dr. Darinka Koron in Roman Mavec; Trajanje: 1. 1. 2019–31. 12. 2021

KORUŽNI OKLASEK KOT OBNOVLJIVI VIRE ENERGIJE

Nosilec projekta: ŽIPO Lenart, d. o. o.; Nosilec projekta na KIS: dr. Viktor Jejčič; Trajanje: 1. 1. 2019–12. 1. 2022

OKOLJSKO UČINKOVITA KMETIJSKA PRIDELAVA KORUZE IN PŠENICE NA VODOVARSTVENIH OBMOČJIH

Nosilec projekta: Interkorn, d. o. o.; Nosilec projekta na KIS: dr. Robert Leskovšek; Trajanje: 1. 1. 2019–31. 12. 2022

ZMANJŠEVANJE OBREMENITEV IZ KMETIJSTVA NA POVRŠINSKE IN PODZEMNE VODE

Nosilec projekta: Geološki zavod Slovenije; Nosilec projekta na KIS: dr. Viktor Jejčič; Trajanje: 23. 10. 2019–22. 10. 2022

TRAVNIŠKI SADOVNJAKI AVTOHTONIH IN TRADICIONALNIH SLOVENSKIH SORT SADJA

Nosilec projekta: UL-BF; Nosilec projekta na KIS: Boštjan Godec; Trajanje: 16. 11. 2019–15. 11. 2022

OKOLJSKI VIDIKI PREUSMERJANJA V EKOLOŠKO PRIDELAVO SADJA

Nosilec projekta: Univerza v Mariboru; Nosilec projekta na KIS: dr. Matej Stopar; Trajanje: 16. 11. 2019–15. 11. 2022

GRAJENI EKOSISTEMI ZA BLAŽENJE VPLIVA KMETIJSTVA NA OKOLJE

Nosilec projekta: Limnos, d. o. o.; Nosilec projekta na KIS: dr. Blaž Germšek; Trajanje: 16. 11. 2019–15. 11. 2022

ANALITIČNI SISTEMI V PODPORO SVETOVANJU NA KMETIJAH

Nosilec projekta: KGZS – KGZ Murska Sobota; Nosilka projekta na KIS: Barbara Zagorc; Trajanje: 23. 11. 2019–22. 11. 2022

REJA PRAŠIČEV ZA PROIZVODNJO IZDELKOV VIŠJE KAKOVOSTI

Nosilec projekta: KGZS – KGZ Murska Sobota; Nosilka projekta na KIS: dr. Marjeta Čandek-Potokar in dr. Martin Škrlep; Trajanje: 23. 11. 2019–22. 11. 2022

UVEDBA NACIONALNEGA GENOMSKEGA OBRAČUNA PLEMENSKIH VREDNOSTI S KOMBINIRANO REFERENČNO POPULACIJO ZA SLOVENSKO RJAVO IN ČRNO-BELO PASMO GOVED

Nosilec projekta: UL-BF; Nosilki projekta na KIS: dr. Betka Logar in Jana Obšteter; Trajanje: 23. 11. 2019–22. 11. 2022

TRAJNOSTNA PRIDELAVA GROZDJA IN VINA

Nosilec projekta: Univerza v Mariboru; Nosilec projekta na KIS: dr. Viktor Jejčič; Trajanje: 23. 11. 2019–22. 11. 2022

VISOKOSTORILNA TRAJNOSTNA PRIDELAVA JABOLK

Nosilec projekta: Univerza v Mariboru; Nosilec projekta na KIS: dr. Matej Stopar; Trajanje: 23. 11. 2019–22. 11. 2022

VZPOSTAVITEV VZDRŽEVALNE SELEKCIJE ČEBULNIC ZA PRIDELAVO ZDRAVEGA SEMENA SLOVENSKIH SORT ČESNA IN ŠALOTKE

Nosilec projekta: Grm Novo mesto; Nosilec projekta na KIS: dr. Peter Dolničar; Trajanje: 23. 11. 2019–22. 11. 2022

TEHNOLOŠKA POSODOBITEV PRIDELAVE GROZDJA IN VINA ZA CVIČEK PTP (CVIČEK PTP)

Nosilec projekta: KGZS – KGZ Novo mesto; Nosilec projekta na KIS: dr. Klemen Lisjak; Trajanje: 6. 11. 2019–5. 11. 2021

VPELJAVA ODBIRE PLEMENSKIH ŽIVALI NA PODLAGI KAKOVOSTI MESA PRI PASMI KRŠKOPOLJSKI PRAŠIČ

Nosilec projekta: KGZS – KGZ Novo mesto; Nosilki projekta na KIS: dr. Marjeta Čandek-Potokar in dr. Urška Tomažin; Trajanje: 6. 11. 2019–5. 11. 2021

Projekti, pri katerih sodelujejo partnerji iz drugih držav / Projects with partners from other countries

Nosilec KIS / AIS as coordinator

TRAJNOSTNI RAZVOJ KMETIJSTVA IN TURIZMA NA ČEZMEJNEM KRASU (AGROTUR II)

Program sodelovanja: Interreg Italija–Slovenija

Nosilec projekta: dr. Klemen Lisjak; Šifra: 1473843258; Trajanje: 1. 10. 2017–31. 3. 2020

VPLIV PODNEBNIH SPREMENB NA RAZŠIRJENOST OGORČIC IZ SKUPINE TROPSKIH OGORČIC KORENINSKIH ŠIŠK (MeloTrop)

Nosilec: dr. Saša Širca; Šifra: Euphresco projekt 2016-A-199; Trajanje: 1. 4. 2017–28. 3. 2020

LINKING ALPINE SOIL KNOWLEDGE FOR SUSTAINABLE ECOSYSTEM MANAGEMENT AND CAPACITY BUILDING (LINKS4SOILS)

Program sodelovanja: Interreg Alpine Space

Nosilec projekta: dr. Borut Vrščaj; Šifra: ASP399; Trajanje: 1. 11. 2016–30. 4. 2020

ZGODNJE ZAZNAVANJE OKUŽB KROMPIRJA S KARANTENSKIMI OGORČICAMI S POMOČJO DALJINSKEGA ZAZNAVANJA (NEMDETECT)

Nosilec projekta: dr. Uroš Žibrat; Šifra: GP/EFSA/ALPHA/2018/02; Trajanje: 6. 12. 2018–5. 12. 2021

QUANTITATIVE AGRICULTURAL POLICY MONITORING IN EIGHT POST-SOVIET COUNTRIES

Program sodelovanja: FAO

Nosilka projekta: dr. Maja Kožar; Trajanje: 16. 12. 2019–15. 12. 2020

KIS sodelujoči / AIS as partner

INTEGRATIVE ALPINE WILDLIFE AND HABITAT MANAGEMENT FOR THE NEXT GENERATION (ALPBIONET2030)

Program sodelovanja: Interreg Alpine Space

Nosilec: Michael Vogel, ALPARC – Alpine Network of Protected Areas, Francija; Nosilec na KIS: dr. Borut Vrščaj; Šifra: ASP 428; Trajanje: 1. 11. 2016–31. 10. 2019

POTENTIAL EXPOSURE OF BUMBLEBEES AND OTHER WILD POLLINATORS TO PESTICIDES IN SPRAYING IN THE EARLY MORNING AND EVENING

Program sodelovanja: EFSA

Nosilec projekta: dr. Danilo Bevk (NIB); Nosilec projekta na KIS: dr. Janez Prešern; Šifra: GP/EFSA/ENCO/2018/02; Trajanje: 26. 9. 2018–25. 9. 2021

SLOVENIAN PATH TOWARDS THE MID-CENTURY CLIMATE TARGET (CLIMATEPATH2050)

Program sodelovanja: LIFE

Nosilka projekta: mag. Andreja Urbančič (Institut Jožef Stefan); Nosilec projekta na KIS: dr. Jože Verbič; Šifra: LIFE16 GIC/SI/000043; Trajanje: 15. 6. 2017–14. 6. 2021

LINKING URBAN AND INNER-ALPINE GREEN INFRASTRUCTURE - MULTIFUNCTIONAL ECOSYSTEM SERVICES FOR MORE LIVEABLE TERRITORIES (LUIGI)

Program sodelovanja: INTERREG ALPINE SPACE

Nosilka projekta: Metropolitan City of Milan; Nosilka projekta na KIS: dr. Irena Bertoncelj; Trajanje: 1. 10. 2019–30. 6. 2022

MREŽA ZA BIOFORMATIKO NA PODROČJU ZDRAVJA RASTLIN (COMMUNITY NETWORK FOR PLANT HEALTH BIOINFORMATICS)

Nosilec: dr. Annelies Haegeman, ILVO, Belgija; Nosilka na KIS: Irena Mavrič Pleško; Šifra: EUPHRESKO PROJEKT 2018-A-289; Trajanje: 1. 4. 2019 – 30. 3. 2022

HITRA IDENTIFIKACIJA RASTLINSKIH PATOGENIH BAKTERIJ Z MASNO SPEKTROMETRIJO MALDI-TOF (RAPID IDENTIFICATION OF PLANT-HEALTH RELATED BACTERIA BY MALDI-TOF MASS SPECTROMETRY)

Nosilec: Perrine Portier, INRA, Francija; Nosilka na KIS: Janja Lamovšek; Šifra: EUPHRESKO PROJEKT 2018-A-271; Trajanje: 1. 3. 2019–28. 2. 2021

COST raziskovalni projekti, pri katerih sodelujejo partnerji iz drugih držav / COST research projects with partners from other countries

INNOVATIVE APPROACHES IN PORK PRODUCTION WITH ENTIRE MALES (IPEMA) - COST ACTION CA15215

Nosilec projekta: prof. Ulrike WEILER (UNIVERSITY OF HOHENHEIM, Germany); Nosilka projekta na KIS, člana MC (Management Committee): dr. Marjeta Čandek-Potokar in dr. Martin Škrlep; Trajanje: 1. 1. 2016–31. 12. 2020

APPLICATION OF NEXT GENERATION SEQUENCING FOR THE STUDY AND DIAGNOSIS OF PLANT VIRAL DISEASES IN AGRICULTURE

Nosilec: dr. Sebastian Massart; Nosilka na KIS: dr. Irena Mavrič-Pleško; Trajanje: 9. 3. 2015–8. 3. 2019

IZKORIŠČANJE TROSMERNIH INTERAKCIJ MED RASTLINAMI, MIKROORGANIZMI IN ČLENONOŽCI ZA IZBOLJŠANJE VARSTVA RASTLIN IN POVEČANJE PRIDELKA

Nosilec: dr. Arjen Biere; Nosilec na KIS: dr. Jaka Razinger; Trajanje: 10. 3. 2015–9. 3. 2019

AMMONIA AND GREENHOUSE GASES EMISSIONS FROM ANIMAL PRODUCTION BUILDINGS

Nosilec projekta: Guoqiang ZHANG (Aarhus University, Danska); Nosilec projekta na KIS: dr. Jože Verbič; Šifra: CA COST Action CA16106; Trajanje: 17. 3. 2017–16. 3. 2021

NADZOR NAD HUMANIMI PATOGENIMI MIKROORGANIZMI V SISTEMIH RASTLINSKE PRIDELAVE - COST CA16110

Nosilec projekta: dr. Leo Van Overbeek; Nosilec projekta na KIS: dr. Hans-Josef Schroers; Trajanje: 6. 3. 2017–5. 3. 2021

Raziskovalni programi in projekti ARRS

Bilateralni raziskovalni projekti, pri katerih sodelujejo partnerji iz drugih držav / Bilateral research projects involving partners from other countries

ZNANSTVENO-RAZISKOVALNO SODELOVANJE MED REPUBLIKO SLOVENIJO IN REPUBLIKO HRVAŠKO

Nosilec: dr. Vladimir Meglič; Šifra projekta: BI-HR/18-19-031; Trajanje: 23. 4. 2018–31. 12. 2019

ZNANSTVENO-RAZISKOVALNO SODELOVANJE MED REPUBLIKO SLOVENIJO IN REPUBLIKO SRPSKO – BIH

Nosilec projekta: dr. Vladimir Meglič; Šifra projekta: BI-BA/19-20-0109; Trajanje: 15. 1. 2019–31. 12. 2020

ZNANSTVENO-RAZISKOVALNO SODELOVANJE MED REPUBLIKO SLOVENIJO IN MADŽARSKO

Nosilec projekta: dr. Vladimir Meglič; Šifra projekta: BI-HU/19-20-003; Trajanje: 1. 1. 2019–31. 12. 2020

Temeljni raziskovalni projekti / Basic research projects

Nosilec KIS / AIS as coordinator

IMUNOKASTRACIJA KOT DEPRIVACIJE ANDROGENOV IN NJENI UČINKI NA FIZIOLOŠKI ODZIV V METODA ZGODNJI IN POZNI FAZI SPOLNEGA RAZVOJA PRAŠIČEV

Nosilka: dr. Nina Batorek Lukač; Šifra: Z7–9416; Trajanje: 1. 7. 2018–31. 6. 2021

KIS sodelujoči / AIS as partner

PROTEINSKI KOMPLEKSI IZ GLIVNEGA RODU PLEUROTUS KOT NOVI BIOPESTICIDI ZA ZATIRANJE KOLORADSKEGA IN KORUZNEGA HROŠČA

Nosilka: dr. Kristina Sepčič (UL-BF); Odgovorni raziskovalec na KIS: dr. Jaka Razinger; Šifra: J4-1772; Trajanje: 1. 7. 2019–30. 6. 2022

Aplikativni raziskovalni projekti / Applied research projects

Nosilec KIS / AIS as coordinator

NOVE PRAKSE ZA BLAŽENJE ABIOTSKEGA IN BIOTSKEGA STRESA KORUZE V LUČI KLIMATSKIH SPREMENB

Nosilec: dr. Uroš Žibrat; Sodelujoča organizacija: UL-BF; Šifra: L4-1840; Trajanje: 1. 7. 2019–30. 6. 2022

IZBOLJŠANJE KAKOVOSTI SLOVENSKE BELIH VIN Z BOLJŠO EKSPRESIJO SORTNIH AROM

Nosilec: dr. Klemen Lisjak; Sodelujoča organizacija: Univerza v Novi Gorici; Šifra: L4-1841; Trajanje: 1. 7. 2019–30. 6. 2022

KIS sodelujoči / AIS as partner

VPLIV TEŽKIH KOVIN NA STARANJE BELIH VIN

Nosilec: dr. Guillaume Antalick (Univerza v Novi Gorici); Odgovoren raziskovalec na KIS: dr. Klemen Lisjak; Šifra: L4-1842; Trajanje: 1. 7. 2019–30. 6. 2022

Ciljni raziskovalni projekti / Targeted research projects

Nosilec KIS / AIS as coordinator

OCENA STANJA ODPORNOSTI ŠKODLJIVIH ORGANIZMOV NA FITOFARMACEVTSKA SREDSTVA V SLOVENIJI

Nosilec: dr. Andrej Simončič; Sodelujoče organizacije: UM FKBV, KGZS Zavod MB, IHPS; Šifra: V4-1601; Trajanje: 1. 10. 2016–30. 9. 2019

KMETOVANJE NA VRSTNO BOGATIH TRAVNIKIH

Nosilec: dr. Jože Verbič; Sodelujoča organizacija: ZRC SAZU; Šifra: V4-1619; Trajanje projekta: 1. 10. 2016–30. 9. 2019

TEHNOLOGIJE ZA KONKURENČNEJŠO PRIDELAVO JABOLK

Nosilec: dr. Matej Stopar; Sodelujoče organizacije: UL BF, KGZ Zavod MB, UM FKBV; Šifra: V4-1612; Trajanje: 1. 10. 2016–30. 9. 2019

UPORABA METOD Z NIZKIM TVEGANJEM ZA VARSTVO ZELENJADNIC

Nosilec: dr. Jaka Razinger; Sodelujoča organizacija: IHPS; Šifra: V4-1602; Trajanje: 1. 10. 2016–30. 9. 2019

TEHNOLOŠKE REŠITVE ZA PRIDELAVO KAKOVOSTNEGA SENA

Nosilec: dr. Viktor Jejčič; Sodelujoče organizacije: FS UNI-LJ, UL BF, UM FKBV; Šifra: V4-1610; Trajanje: 1. 10. 2016–30. 9. 2019

SPREMLJANJE ZALOG OGLJIKA V KMETIJSKIH IN GOZDARSKIH RABAH TAL ZA POTREBE POROČANJA O NACIONALNI BILANCI OGLJIKA

Nosilec: dr. Borut Vrščaj; Sodelujoče organizacije: Gozdarski inštitut Slovenije, UM FKBV, UL BF; Šifra: V4-1628; Trajanje: 1. 10. 2016–30. 9. 2019

UPORABA PODATKOV SATELITSKEGA SISTEMA SENTINEL TER NEKATERIH OSTALIH PODATKOV DALJINSKEGA ZAZNAVANJA ZA KONTROLO NEPOSREDNIH PLAČIL V KMETIJSTVU

Nosilec: dr. Uroš Žibrat; Sodelujoča organizacija: SINERGISE, laboratorij za geografske informacijske sisteme, d. o. o.; Šifra: V4-1811; Trajanje: 1. 11. 2018–31. 4. 2020

UGOTAVLJANJE ŠKOD V ČEBELARSTVU

Nosilka: dr. Maja Ivana Smodiš Škerl; Sodelujoča organizacija: Čebelarska zveza Slovenije; Šifra: V4-1807; Trajanje: 1. 11. 2018–30. 4. 2020

ZMANJŠEVANJE IZPUSTOV TOPLOGREDNIH PLINOV IN AMONIJAKA NA KMETIJSKIH GOSPODARSTVIH

Nosilec: dr. Jože Verbič; Sodelujoča organizacija: UL-BF; Šifra: V4-1816; Trajanje: 1. 11. 2018–30. 10. 2020

PREUČITEV IN PREDLOG IZBORA NAJPRIMERNEJŠIH NEKEMIČNIH METOD ZATIRANJA PLEVELA KOT NADOMESTILO ZA UPORABO GLIFOSATA IN DRUGIH HERBICIDOV ZA SLOVENSKE RAZMERE

Nosilec: dr. Robert Leskovšek; Sodelujoče organizacije: KGZS-KGZ Maribor, UL-BF, UM-FKBV; Šifra: V4-1801; Trajanje: 1. 11. 2018–30. 4. 2021

VZPOSTAVITEV SISTEMA VZORČNIH KMETIJ ZA NAMEN STALNEGA SPREMLJANJA KAZALCEV TRAJNOSTNEGA KMETIJSTVA

Nosilec: dr. Andrej Simončič; Sodelujoče organizacije: UL-BF, UM-FKBV, KGZS-KGZ Murska Sobota; Šifra: V4-1813; Trajanje: 1. 11. 2018–30. 10. 2021

VZPOSTAVITEV SISTEMA UPORABE DNA MARKERJEV ZA GENETSKO IDENTIFIKACIJO PRI PREVERJANJU SORTNE PRISTNOSTI IN ČISTOSTI POMEMBNEJŠIH VRST ŽIT IN KRIŽNIC KOT OSNOVA ZA KAKOVOSTNO PRIDELAVO SEMENSKIH POSEVKOV TER VARNO IN KAKOVOSTNO PRIDELANO HRANO IN KRMO

Nosilec: dr. Vladimir Meglič; Šifra: V4-1806; Trajanje: 1. 11. 2018–30. 10. 2021

OBVLADOVANJE PLODOVE VINSKE MUŠICE (DROSOPHILA SUZUKI) Z METODAMI Z NIZKIM TVEGANJEM

Nosilec: dr. Jaka Razinger; Sodelujoče organizacije: GIS, IHPS, KGZS-KGZ Nova Gorica; Šifra: V4-1802; Trajanje: 1. 10. 2018–30. 09. 2020

OGROŽENOST LOKALNIH SORT ZARADI GENSKE EROZIJE IN NJIHOVA VREDNOST ZA PRIDELAVO IN UPORABO

Nosilka: dr. Kristina Ugrinović; Sodelujoča organizacija: UL BF; Šifra: V4-1618; Trajanje: 1. 10. 2016–30. 9. 2019

KIS sodelujoči / AIS as partner

UVEDBA GENOMSKE SELEKCIJE IN GENOTIPIZACIJE PRI MLEČNIH PASMAM GOVEDI V SLOVENIJI

Nosilka: dr. Marija Klopčič (UL-BF); Odgovorna raziskovalka na KIS: dr. Betka Logar; Šifra: V4-1613; Trajanje: 1. 10. 2016–30. 9. 2019

UPORABA HMELJNIH PRIPRAVKOV ZA EKOLOŠKO ZATIRANJE VAROJE (Varroa destructor)

Nosilec: dr. Iztok Jože Košir (IHPS); Odgovorni raziskovalec na KIS: dr. Janez Prešern; Šifra: V4-1605; Trajanje: 1. 10. 2016–30. 9. 2019

UČINKI IN PERSPEKTIVE SKP NA SLOVENSKO KMETIJSTVO IN PODEŽELJE

Nosilec: dr. Luka Juvančič (UL BF); Odgovorni raziskovalec na KIS: Tomaž Cunder; Šifra: V4-1608; Trajanje: 1. 10. 2016–30. 9. 2019

ANALITIČNE PODPORE ZA VEČJO UČINKOVITOST IN CILJNOST KMETIJSKE POLITIKE DO OKOLJA IN NARAVE SLOVENIJE

Nosilec: dr. Andrej Udovč (UL-BF); Odgovorna raziskovalka na KIS: dr. Tanja Travnikar; Šifra: V4-1814; Trajanje: 1. 11. 2018–31. 10. 2020

ZMANJŠANJA SUŠNEGA STRESA IN POVEČANJA RODOVITNOSTI TAL Z UVAJANJEM OHRANITVENE (KONZERVACIJSKE) OBDELAVE TAL V TRAJNOSTNO POLJEDELSTVO

Nosilec: dr. Denis Stanjko (UM-FKBV); Odgovorni raziskovalec na KIS: dr. Aleš Kolmanič; Šifra: V4-1815; Trajanje: 1. 11. 2018–31. 10. 2021

RAZVOJ MODELA ZA SISTEMATIČNO SPREMLJANJE EKONOMSKEGA POLOŽAJA IN ANALIZO VPLIVA KMETIJSKE POLITIKE NA RAVNI TIPIČNIH KMETIJSKIH GOSPODARSTEV

Nosilec: dr. Jaka Žgajnar (UL-BF); Odgovorna raziskovalka na KIS: Barbara Zagorc; Šifra: V4-1809; Trajanje: 1. 11. 2018–31. 10. 2021

NATANČNOST NAPOVEDOVANJA NAMAKANJA - TRIN

Nosilka: dr. Marina Pintar (UL-BF); Odgovorni raziskovalec na KIS: mag. Tomaž Poje; Šifra: V4-1609; Trajanje: 1. 10. 2016–30. 1. 2019

Projekt Mladi raziskovalec / Early stage researcher projects

PROUČEVANJE KVANTITATIVNE ODPORNOSTI PROTI KROMPIRJEVI PLESNI, POVEZANE Z GENOM RPI-SMIRA2 / R8 PRI KROMPIRJU (SOLANUM TUBEROSUM L.)

Mentor: dr. Vladimir Meglič; Mlada raziskovalka: Eva Blatnik, mag. mol. biol.; Šifra: 60027; Trajanje: 1. 10. 2017–30. 9. 2021

RAZLIČNE METABOLNE KATEGORIJE PRAŠIČEV – PRIMERJAVA NA NIVOJU GENOV, LIPIDOV IN PROTEINOV TER POVEZAVA S KAKOVOSTNIMI ASPEKTI MIŠIČNINE IN ADIPOZNEGA TKIVA

Mentor: dr. Martin Škrlep; Mlada raziskovalka: Klavdija Poklukar, mag. bioteh.; Šifra: 60026; Trajanje: 1. 10. 2017–30. 9. 2021

VPLIV ZEMLJIŠČA NA SEKUNDARNE METABOLITE GROZDJA IN VINA

Mentor: izr. prof. dr. Borut Vrščaj; Somentor: dr. Klemen Lisjak; Mlada raziskovalka: Alenka Mihelčič, mag. ekol. biod.; Šifra: 60028; Trajanje: 1. 10. 2018–30. 9. 2022

PROUČEVANJE KVANTITATIVNIH IN KVALITATIVNIH LASTNOSTI IN ANALIZA ODZIVA NA ABIOTSKI IN BIOTSKI STRES POMEMBNEJŠIH POLJŠČIN

Mentor: dr. Vladimir Meglič; Mlada raziskovalka: Ana Vojnovič, mag. biol.; Šifra: 60029; Trajanje: 1. 10. 2019–30. 9. 2023

PROUČEVANJE STRATEGIJ INTEGRIRANEGA PRISTOPA UPRAVLJANJE PLEVELNE VEGETACIJE

Mentor: dr. Robert Leskovšek; Mlada raziskovalka: Sergeja Adamič, mag. inž. hort.; Šifra: 60024; Trajanje: 1. 10. 2019–30. 9. 2023

VPLIV PREHRANSKEGA STATUSA MOŠTA Z DUŠIKOM TER ZASTOPANOSTI VRST IN SEVOV KVASOVK NA AROMATIČNE SPOJINE IN SENZORIČNO KAKOVOST VINA

Mentor: dr. Franc Čuš; Mlada raziskovalka: Polona Zabukovec, mag. inž. preh.; Šifra: 38190; Trajanje: 1. 10. 2015–30. 9. 2020

RAZISKAVE ODZIVA RASTLIN NA BIOTIČNI IN ABIOTIČNI STRES TER RAZVOJ NOVIH STRATEGIJ OBVLADOVANJA DEJAVNIKOV STRESA

Mentorica: dr. Barbara Gerič Stare; Mladi raziskovalec: Nik Susič, mag. inž. preh.; Šifra: 38128; Trajanje: 1. 10. 2015–30. 9. 2019

UPRAVLJANJE TROFIČNIH INTERAKCIJ V RIZOBIOMU KORUZE IN KROMPIRJA ZA IZBOLJŠANO ZAŠČITO PRED STRUNAMI

Mentor: dr. Jaka Razinger; Mladi raziskovalec: Eva Praprotnik, mag. varst. nar.; Šifra: 60024; Trajanje: 1. 11. 2018–31. 10. 2022



GENSKA
KMETIJSKIH
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Dan
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Od genskega vira do nove sorte
kmetijskih rastlin

Kmetijski inštitut Slovenije

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Dan oČarljivih rastlin koordinira
Slovenski inštitut
za kmetijske rastline



ULIO

Dan oČarljivih rastlin je izdajatelj
izdaja v Ljubljani



2019

Poročilo o delu 2019
Annual report 2019



Kmetijski inštitut Slovenije
Agricultural Institute of Slovenia