



The short history of animal nutrition department

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Department of Animal Nutrition



Historical facts about Department of Animal Nutrition

- Founded in 1919. – celebrates 100th anniversary
- Academic staff – 34
- Technical staff – 32
- Students – 12 460
- Publications – 1149
- Books – 98



From the beginning 1918. to 1945.

Age of discovering micronutrients

- Starch equivalent (Kellner, 1905.)
- Early years of 20th century expanding enormously research in nutrition
- Discovery vitamins Funk 1912 – 17 Nobel Prizes in vitamin discovering

Vitamin B1	Vitamin A	Vitamin C	Vitamin D	Vitamin B2	Vitamin E	Vitamin K	Pantotenic
1897	1909	1912	1918	1920	1922	1929	1931

- Essentials fatty acids – vitamin F – 1929
- **Latest amino acids:** oxyglutamic acid 1918, Methionine 1922
- **Mineral** importance is discovered in the second half of the 20th century

P	Ca	J	NaCl	Fe	K	Mg	Cu	Mn	Zn	Co	F	Se
1776	1808	1820	1847	1872	1883	1918	1928	1931	1934	1935	1942	1957

Croatia Agriculture History

Population 3 400 000

135 farmer/ha, England 7

80% of crop land is cereals mainly maize

14% protein animal origin

1 200 000 cattle, 2018 414 000

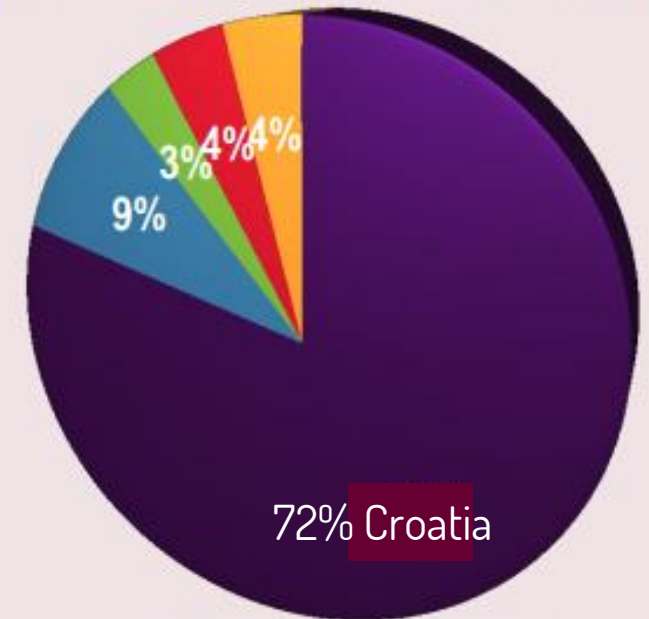
1918-1925

Excellent period for agriculture and students in the new country

80% budget for education in Croatia and Slovenia

Zaposlene osobe po glavnom zanimanju iz 1921.

- Poljoprivreda, šumarstvo i ribarstvo
- Industrija i obrt
- Trgovina, bankarstvo i transport
- Javne službe, vojska i slobodna zanimanja
- Ostala zanimanja i osobe bez zanimanja



Mirković, Mijo: *Ekonomska struktura Jugoslavije 1918 – 1941*. Zagreb: Nakladni zavod Hrvatske 1950. str 18.

Establishment of Faculty

- 1789 – Practical Agriculture School
- 1841 – High Agriculture schools
- 1860. 19.10 College of Agriculture and Forestry in Križevci
- 1919. 31. 8. Faculty of Agriculture and Forestry.
- Merger between College of Agriculture Križevci and Collage of Forestry Zagreb
- **7th. faculty** in Croatia

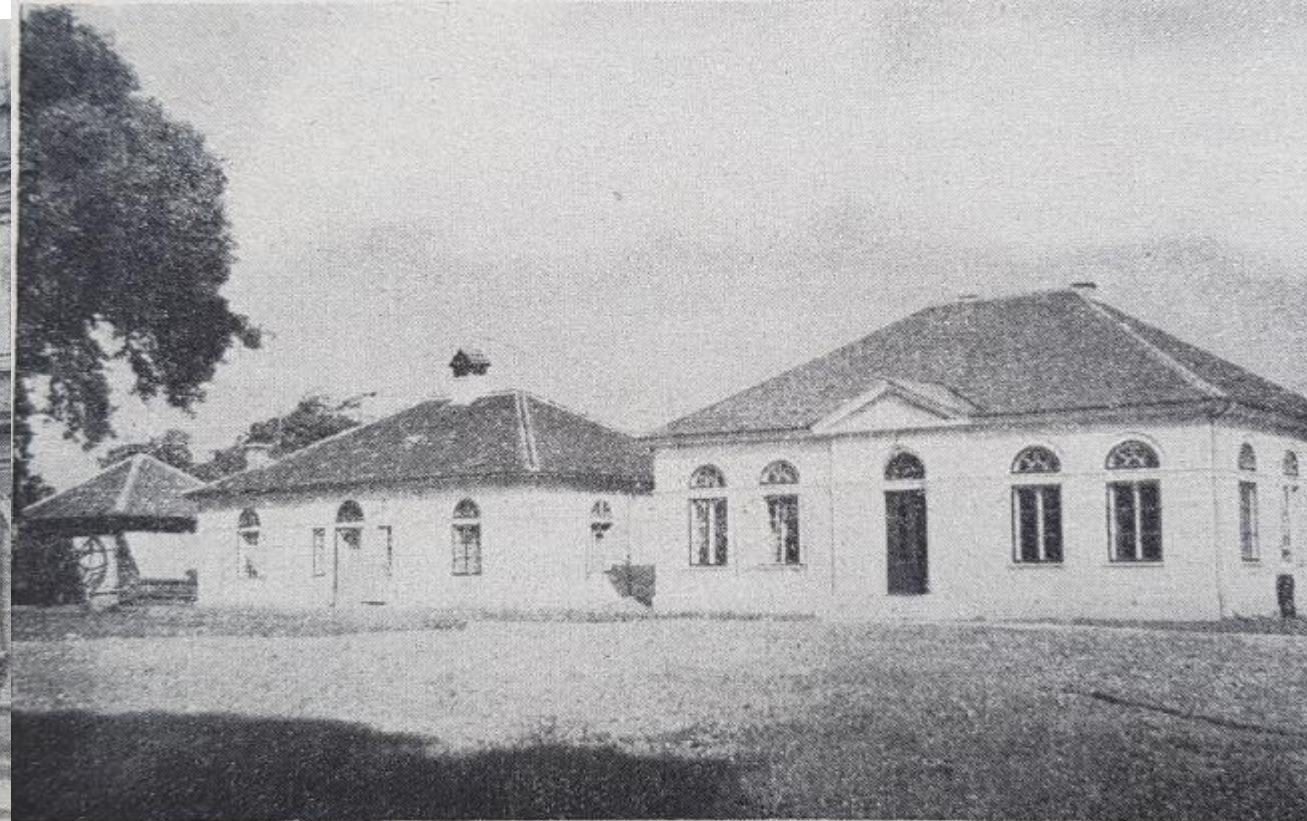
Faculty at the beginning

- Faculty - 13 full professor, 6 associate professor, 6. assistant professor
- Study 3 and 4. years
- Students 206 -
 - Croatia 108, Bosnia and Herzegovina 31, Slovenija 23, Others 8
- Up to 1929 184 student earn title engineer.
- Senior graduate students 100%

Faculty of Agriculture and Forestry 1919. - 1921.



Gospodarski odio gospod.-šum. fakulteta.



Eksperimentalni odio zavoda za živinogojstvo u Maksimiru.

Experimetal units

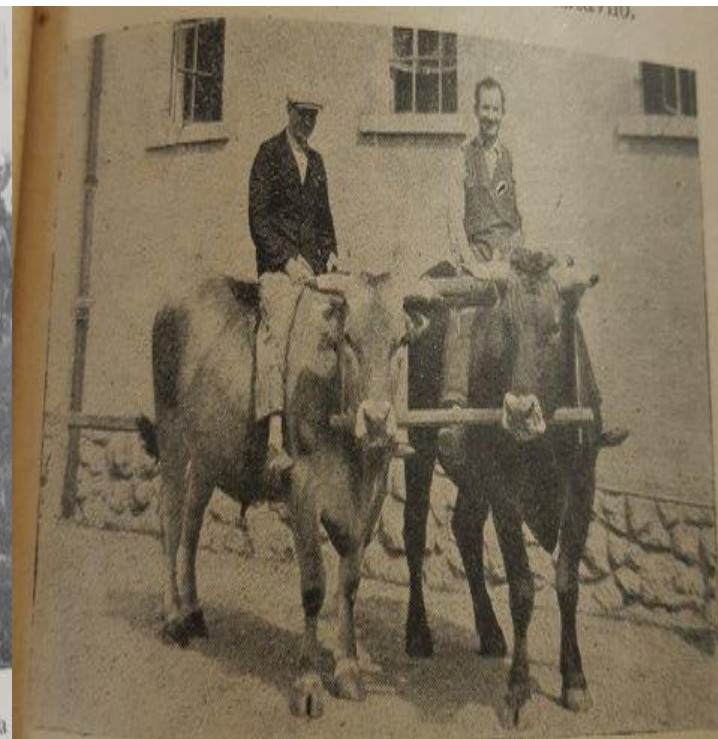


Relativno moderna, masivna štala. Ovakve se štale smatraju klasičnim prema starijem načinu gradnje (1930). Za onodobno shvaćanje tehničke opreme štale, zračnice su vrlo obilno izvedene (vertikalne i horizontalne stropne ventilacije). I na toj je štali prostran sjenik, ali ne onako masivno izveden, kao na prethodnoj slici (drvena izvedba obloga sjenika u nadgradnji nad stropom štale). Prozorska površina (na obje strane štale isti broj prozora) je dovoljna i iznosi oko 1/20 podne površine. (Kravska štala na F. D. Maksimir, Zagreb; Foto Smalcelj, 1938)



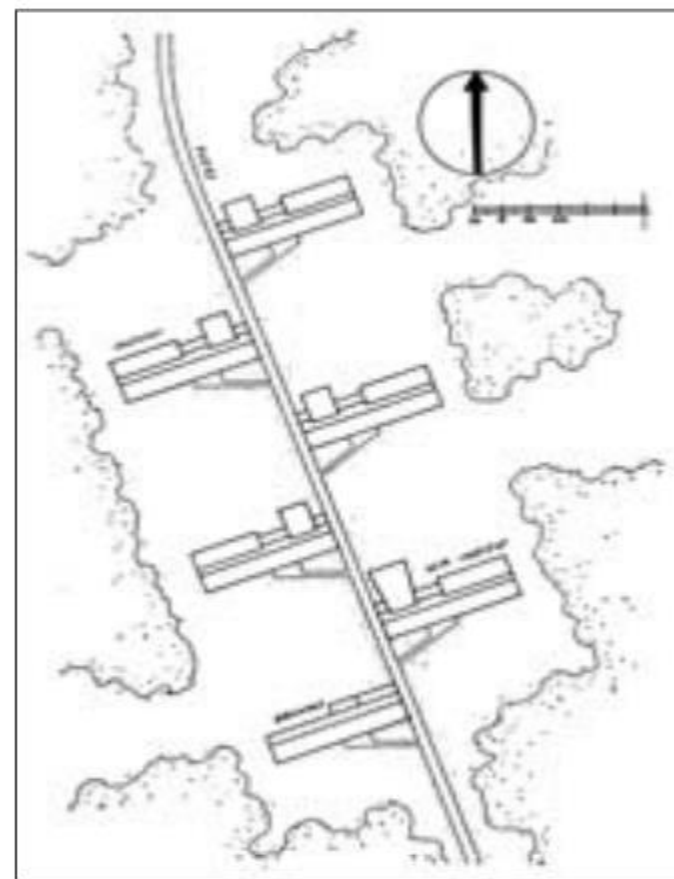
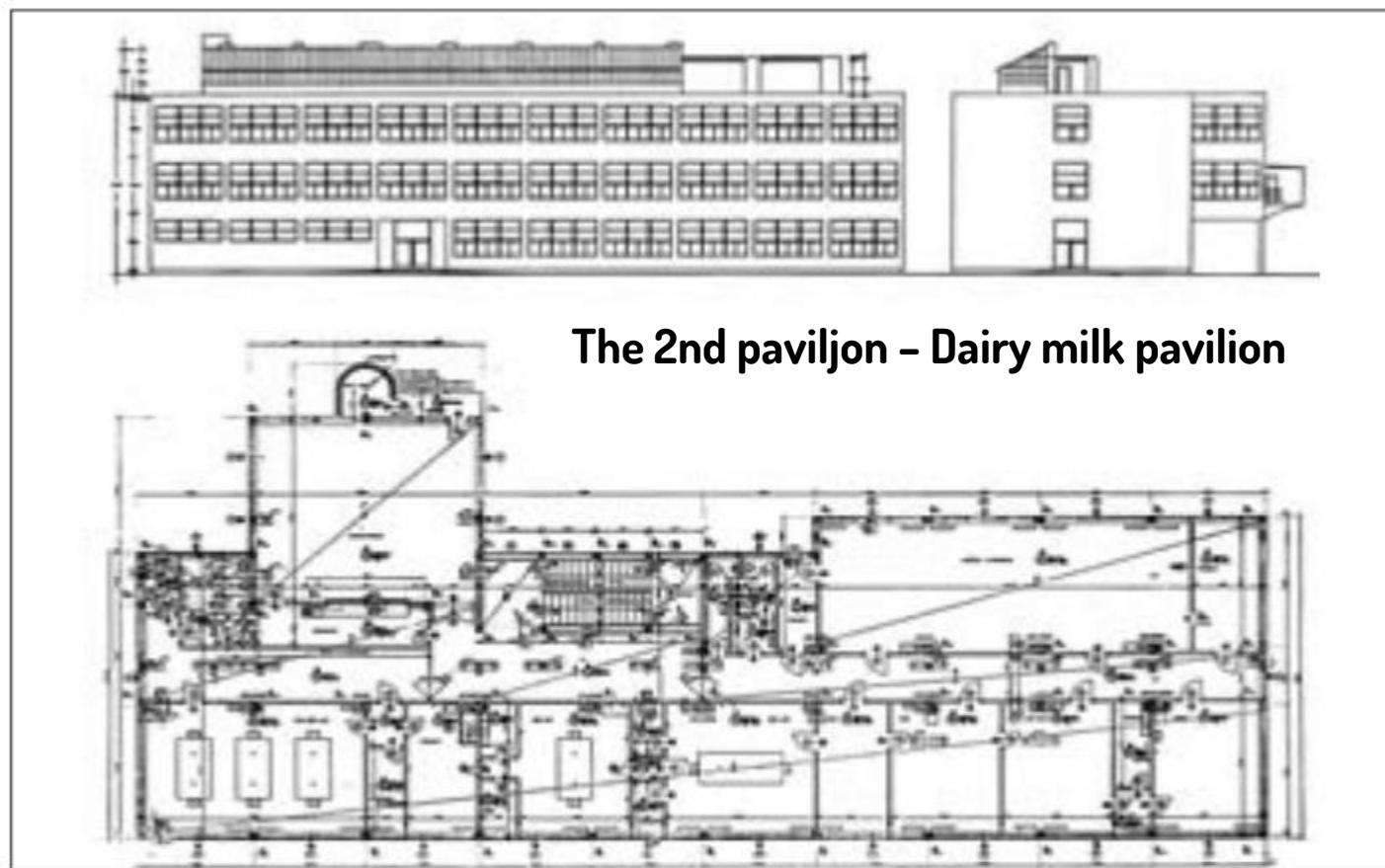
Bikovska štala na jednom većem dobru (F. D. Maksimir, Zagreb). Da s bikovima lakše ophodi, da budu mirniji i podvrgnuti posebnoj njezi, obično je, da se bikovi odvajaju iz kravske štale. Pred štalom je prostran ispasti za svakog bika posebno. Inače je raspored prostora sličan kao i u kravskoj štali.

(Foto Smalcelj, 1938)



22. Montafonski volovi fakultetskog dobra u Maksimiru. Na njima jaše maksimirski kravari. Po tome vidimo, kako su mirne čudi.

Zagreb Group: Layout plan of the Faculty of Agronomy and Forestry project 1932.



three pavilions realized until 1940

Faculty of Agriculture and Forestry 1938. and 2003.



Chair of mountain agriculture, grassland management and domestic animal nutrition

- Animal nutrition is a part of livestock subject – extensive nutrition
- Livestock with domestic animal nutrition – 6 + 2 in 3 and 4 term mandatory exam
- Department equipped to do feed analysis
- 1921 Experimental field and building – 726 ha, pigsty -80, dairy barn 100, and henhouse
- 1938 Department of domestic animal nutrition separate from Livestock one

Professor and head of department

- **Sava Ulmanky**

- (Zagreb, 3. I. 1886. – Trahütten, Austrija, 1947.)

- 1911 – Dissertation – Studie über die Abstammung des Šiškaschweines (Hochschule für Bodenkultur, Wien)

- Professor of subject scholar year 1919/20 – 1927/28) the subject is

- „Mountain agriculture, grassland management and domestic animal nutrition”

- Field of research: – chemical composition and nutritive value of some important crops

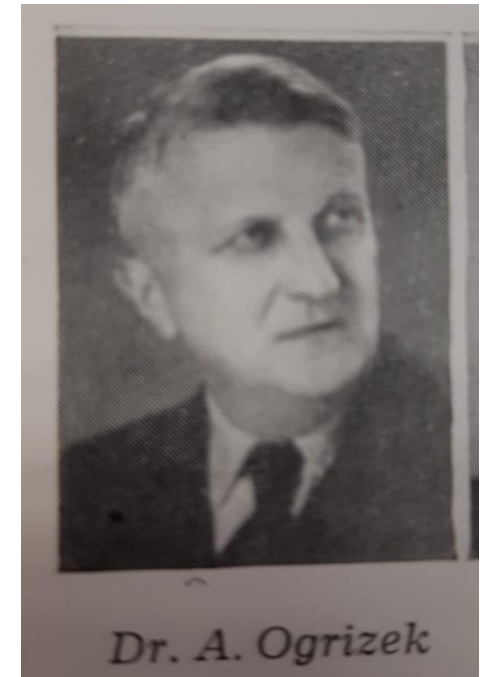
- Retire in 1933

- Član ministarstva prosvjete kada je ministar **Stjepan Radić** – field work, books, lectures



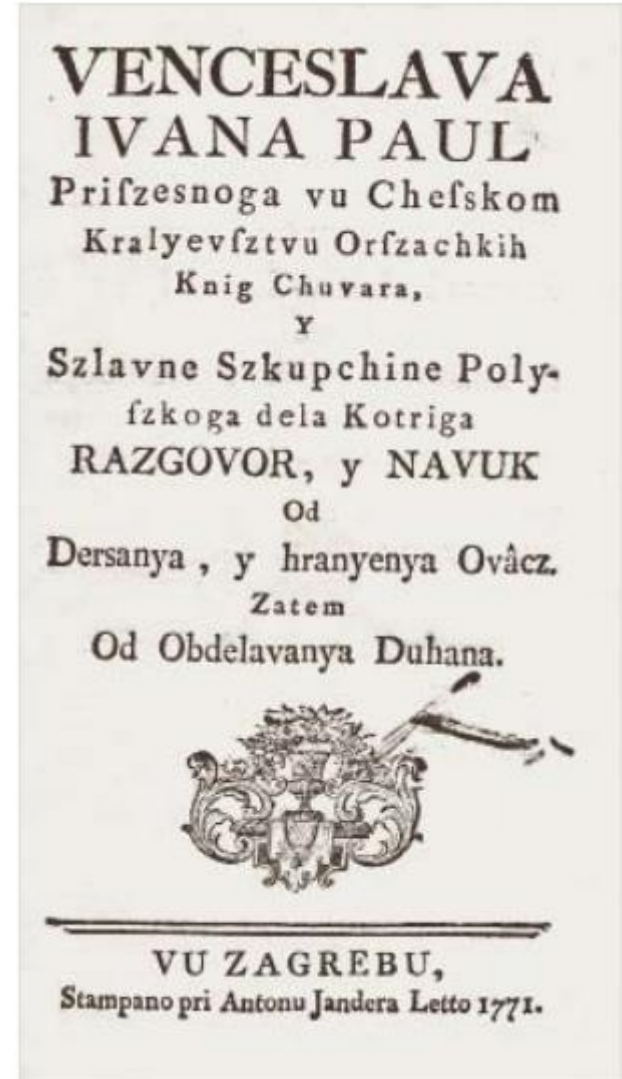
Albert Ogrizek

- Born in Osijek, 11. IV. 1891. – die in Zagreb, 22. VII. 1970.
- 1914. – Hochschule für Bodenkultur, Wien mentor Adametz L.
- Dissertation – Studie über die Abstammung des Veglia-Ponys
- Professor at FAF from 1922. to 1969.
 - Professor of Mountain agriculture, grassland management and domestic animal nutrition” from 1927/28 to 1937/38)
 - Field of research: feeding young animals
- Professor at the Veterinary faculty Zagreb
- Publication 11 university book, 65 scientific papers



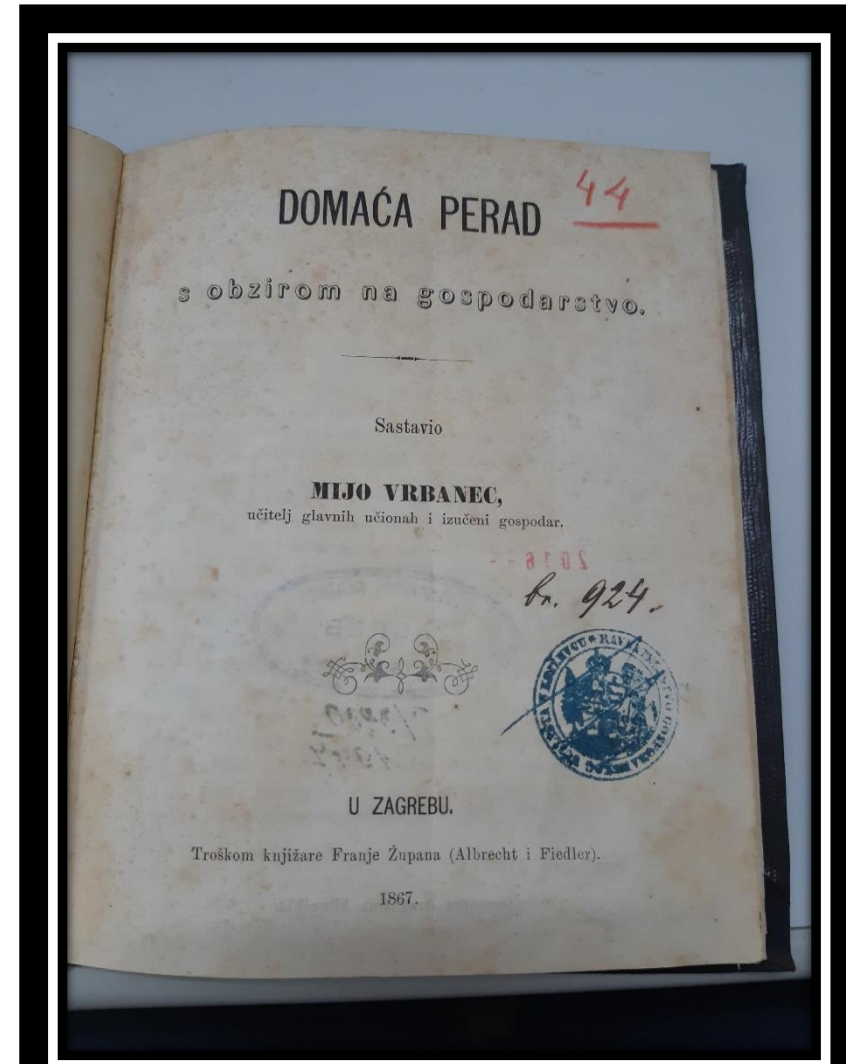
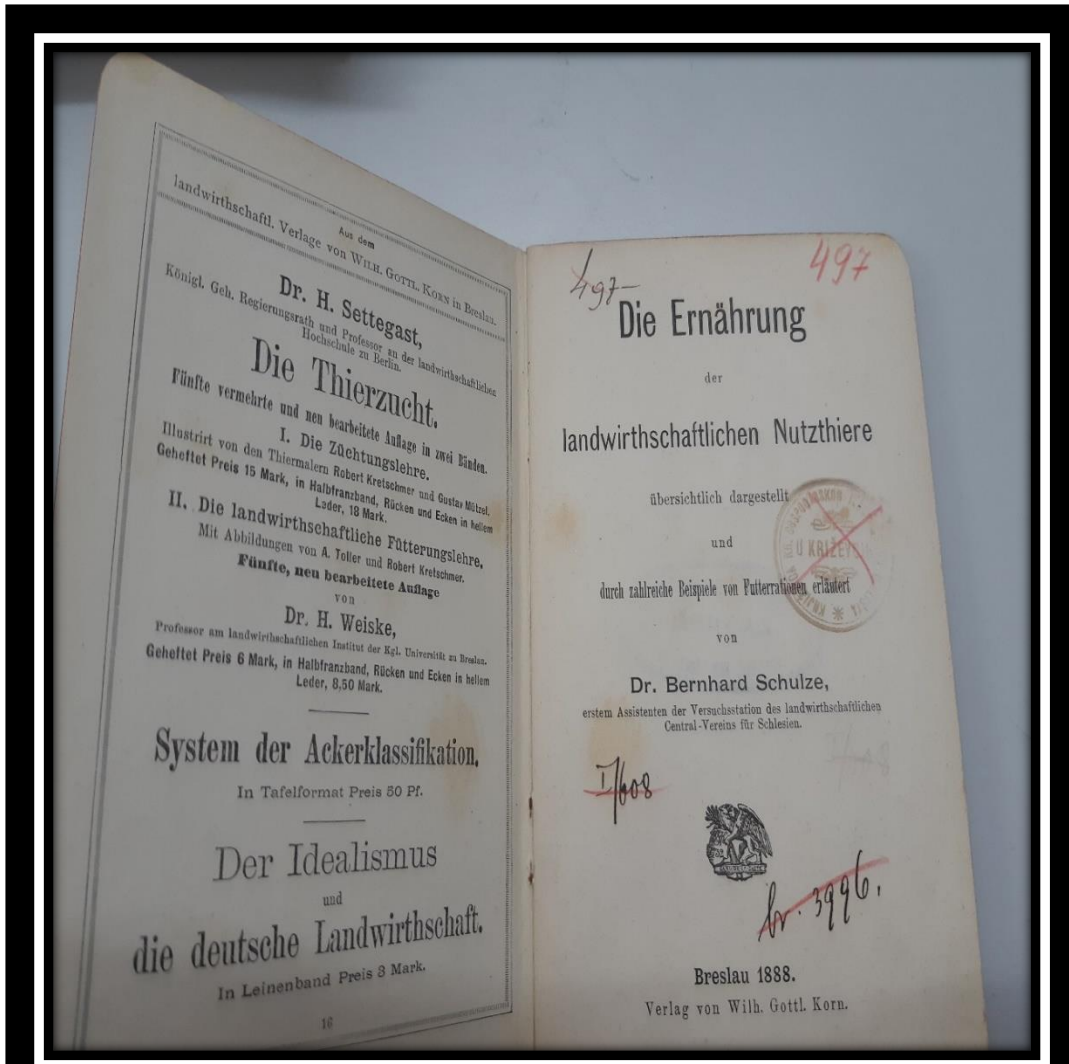
The First book 1771.

- 1771. Venceslava Ivana Paulusa
- Razgovor, y navuk od dersanya, y hranyenya ovacz
- 1865. Franjo Klaić
- Small Animal Keeper

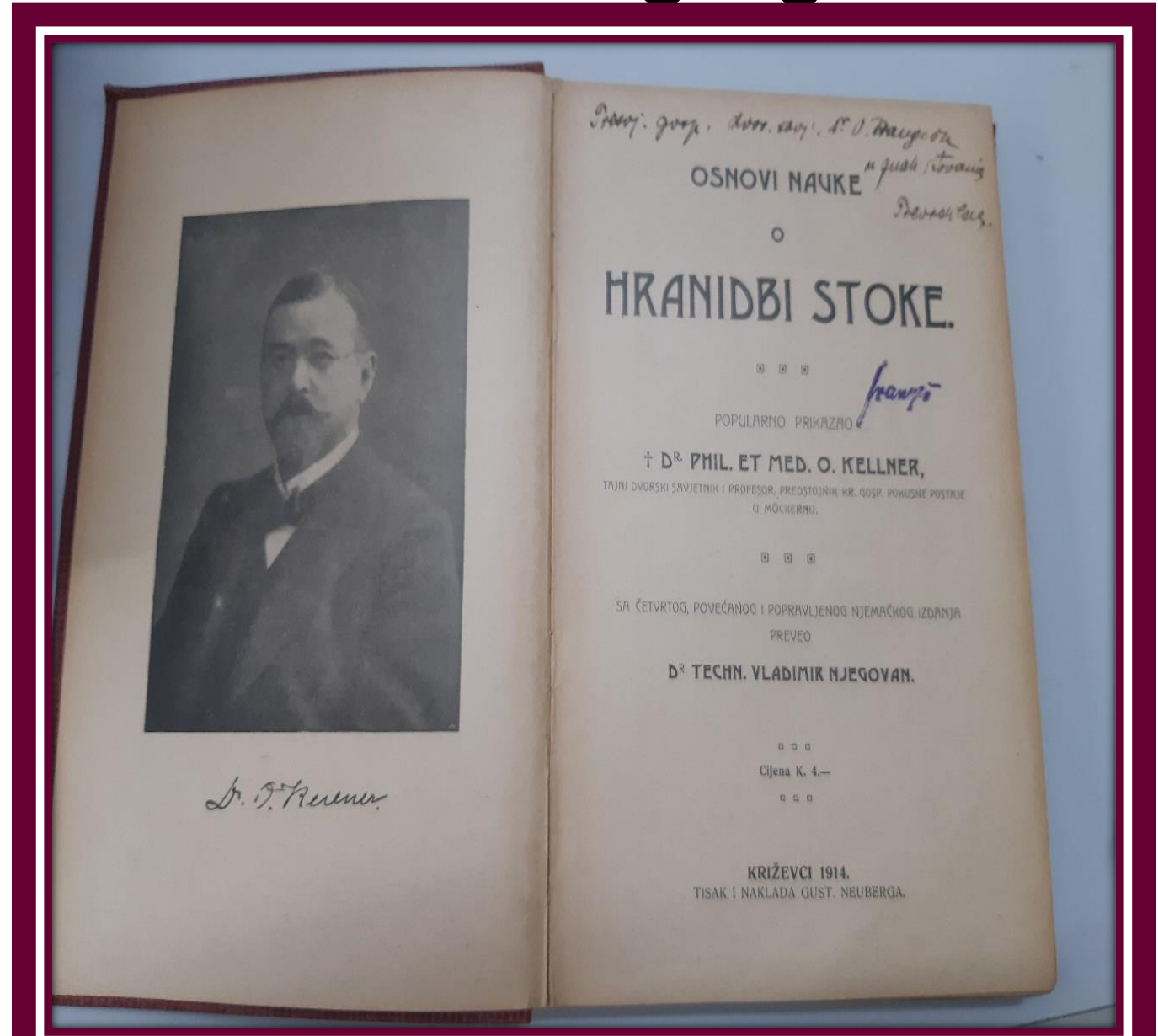
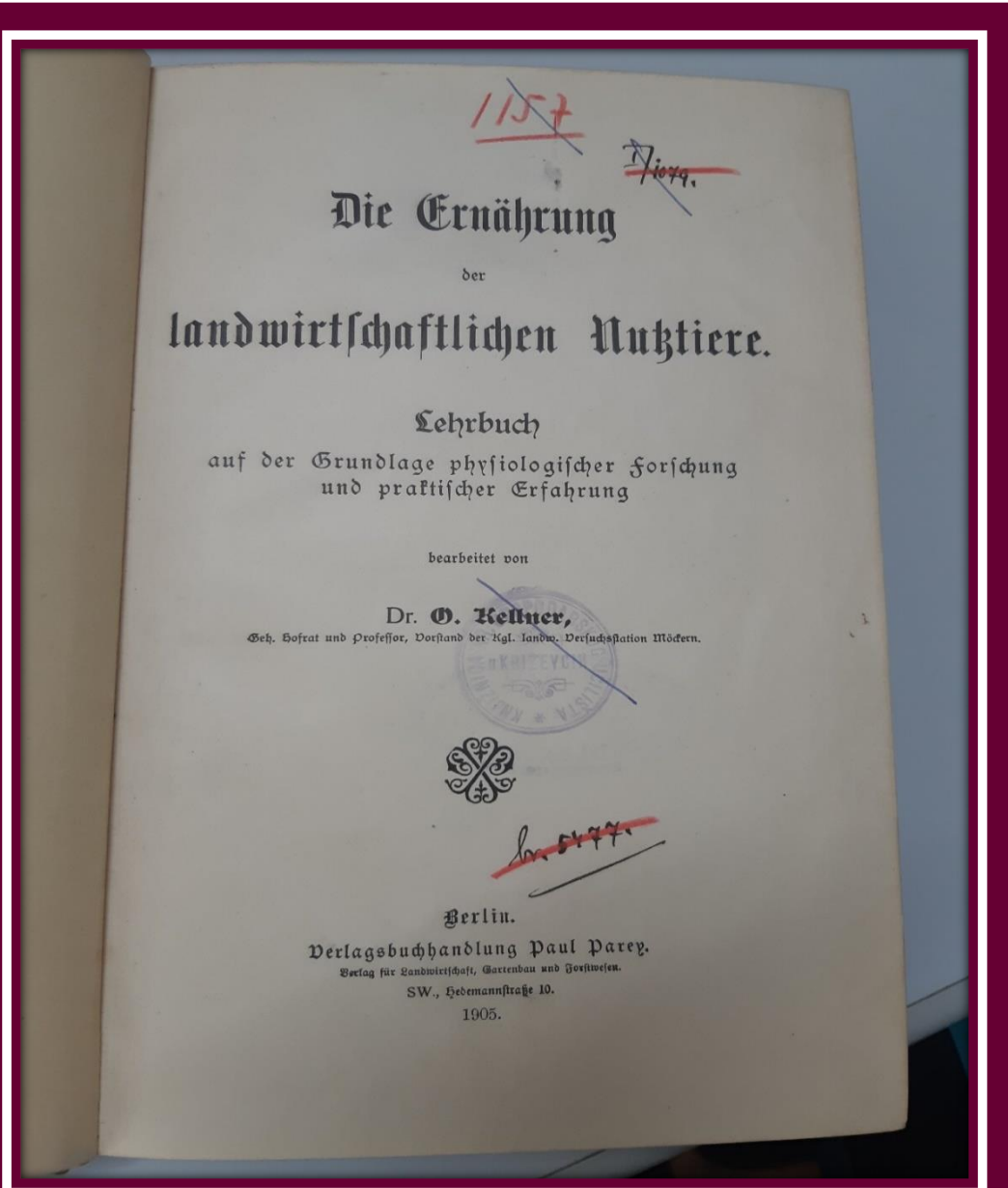


Die Ernährung landwirthschaftlichen Nutztiere 1888

The nutrition of farm animals



First Animal Nutrition book in Croatian language 1914.



Stärkewert. Diese sind vor allen Dingen einzuhalten und sorgfältig zu be- rechnen. Weniger wichtig und größeren Schwankungen unterworfen sind die Zahlen für die stickstoffreichen Extraktstoffe + Rohfaser, bezw. Kohlehydrate, deren Menge — je nach der Fertigkeit der verbaulichen Nährstoffe — innerhalb ziemlich weiter Grenzen schwanken kann. Demzufolge ist auch das Eiweiß- (bezw. Nährstoff-) Verhältnis unter den meisten Verhältnissen der Produktion nicht konstant. Nur da, wo das verdauliche Eiweiß für die Produktion nicht unmittelbar Verwendung findet, also beim Erhaltungsfutter, bei der Mästung ausgewachsener Tiere und bei schwacher Arbeitsleistung, ist dem Eiweißverhältnis stets dann Beachtung zu schenken, wenn man sich an die untere Grenze der Normen hält. Hier muß als Regel gelten, daß ein weiteres Eiweißverhältnis als 1:10—12 nicht eingehalten wird, damit die sonst eintretende Verdauungs- depression (S. 48) vermieden wird.

Bei der Berechnung der Rationen wird man also so zu Werke gehen, daß man vor allem die in Aussicht genommene Menge des verbaulichen Eiweißes und den Stärkewert berechnet, dabei auch das Volumen und die Verdaulichkeit der Futterstoffe berücksichtigt und gegebenenfalls auch die Menge des verbaulichen Fettes beachtet. Die übrigen Angaben der Normen dienen nur zur weiteren Kontrolle des Nährwertes der Ration.

Tabelle I. Zusammenziehung, Verdaulichkeit und Stärkewert der Futtermittel.

(Nachdruck auch auszugsweise verboten.)

Table with columns for Rohstoffe (Säure, Rohprotein, Stärke, etc.) and Verdaul. Nährstoffe (Stärke, Rohprotein, etc.). Rows include Grünfutter, a) Gräser, and various types of grass and clover.

Tabelle I. Zusammenziehung, Verdaulichkeit und Stärkewert der Futtermittel.

Table with columns for Rohstoffe (Säure, Rohprotein, Stärke, etc.) and Verdaul. Nährstoffe (Stärke, Rohprotein, etc.). Rows include various types of clover, alfalfa, and other forage crops.

u normama, jer se mjera suhih tvari bez štete kreće u prilično velikim granicama (str. 126), a kad se određuje hranjiva vrijednost krmiva, ne može se uopće izbjeći malim pogreškama. Može se mirne duše računati i sa surovim proteinom, ako se samo pazi, da se ne uzmu u obrok krmiva, koja imaju mnogo samih amida. Sadržaj masti u obroku kontrolira se, ako treba, na isti način, kao i količine probavljive bjelancevine.

Medu tako proračunanim dopunjicima obroka izaberu se takovi, koji su najjeftiniji. Zato se upotrebljuju tržne cijene, uz koje se dotična krmiva zaista mogu dobiti. Ne valja u račun uvrštavati bilo kakove novčane jedinice ili kakove druge pomoćne brojeve, jer svi takovi brojevi obično su poprečni brojevi cijelih država i iz određenih vremena, pa samo u izuzecima vrijede za pojedina mjesta i za određeno vrijeme.

Norme, navedene u III. tablici ne treba smatrati kao recepte, koji se ne mogu mijenjati, nego samo kao neki oslon, prema kojemu treba svaki gospodar da odredi, u kojem pravcu i kako daleko smije da se od njih udalji.

Tabela I. Sastav, probavljivost i škrobna vrijednost krmiva.

(Preštampavanje, ma i djelomično, nije dozvoljeno.)

Table with columns for Voda, Surove hranive tvari (sur. protein, sur. mast, nedusične ekstrakt tvari, sur. vlakna, pepeo), Probav. hranive tvari (sur. protein, sur. mast, nedusične ekstrakt tvari, sur. vlakna), Vrijednost (Pun-100, i robavljiva bjelancevina), and Škrobna vrijednost za 100 kg. Rows include I. Zelena krma, a) Trave, and various types of grass and clover.

Table with columns for Surove hranive tvari (voda, sur. protein, sur. mast, nedusične ekstrakt tvari, sur. vlakna, pepeo), Probav. hranive tvari (sur. protein, sur. mast, nedusične ekstrakt tvari, sur. vlakna), Vrijednost (Pun-100, i robavljiva bjelancevina), and Škrobna vrijednost za 100 kg. Rows include zob za klasanje, cvatnje, zrele, proso, klopčasta oštrica prije i za početka cvatnje, klopčasta oštrica za cvat, kukuruz američki, evropski, mohar za cvatnje, ljuži, engleski, za cvatnje, franceski, talijanski, rač. krmna, slatki sirak, mačji repak za cvatnje.

Table with columns for Surove hranive tvari (voda, sur. protein, sur. mast, nedusične ekstrakt tvari, sur. vlakna, pepeo), Probav. hranive tvari (sur. protein, sur. mast, nedusične ekstrakt tvari, sur. vlakna), Vrijednost (Pun-100, i robavljiva bjelancevina), and Škrobna vrijednost za 100 kg. Rows include Crvena djetel. vrlo mlada sa pašnjaka, crvena djet. za pupanja, rumena djetelina, svedska u početku cvatnje, rumena djet. u punom cv., inkarnatska djetelina u cv., bijela djetel. u početku cv., lucerna, vrlo mlada, pred cvatnjom, u punom cvatu, esparzeta u početku cvat., seradela u početku cvat., seradela u punom cvatu, ždraljika za cvatnje, ljekarica, mala žuta, pješćana djetelina, ranovka, bob u početku cvatnje, grašak, grahorica u početku cvat., lupina (vučika) u počet. cv., pelniška, kosmata grahorica, sastrica prije cvatnje, graorasta leća za.

Ivan Šmalcelj (1912. – 1978.)



- Born in Travnik 31.07.1912.
- Dissertation in 1936 „Recognition of economical properties of privorska sheep and mountain agriculture in Privora”
- Training of Animal Nutrition at University of Königsberg
- **The first professor of Domestic Animal Nutrition** 1942/45
- Establish Laboratory for proximate chemical analysis of feed materials
- Professor of Feed materials and Animal Nutrition at The Veterinary faculty Sarajevo, 1952 -1958
- Author of 5 books – included chapter of animal nutrition
- First nutritional paper: Influence of soybean meal in dairy cows diets on milk yield and fat content.

I. ŠMALCELJ:

MALA HRANIDBA DOMAĆIH ŽIVOTINJA

(OPĆI DIO I POUKE O KRMIVIMA)

ZAGREB 1945
NAKLADA KNJIZARE V. CVITKOVIĆ

3

Dnevne količine kreme u obrocima raznih vrsta i kategorija domaćih životinja

Kategorija	KOVA		LOVCI		STOČARSTVO		PROMET		DVA		KOLA		TRAKTOR	
	1945	1946	1945	1946	1945	1946	1945	1946	1945	1946	1945	1946	1945	1946
1. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
2. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
3. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
4. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
5. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
6. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
7. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
8. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
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12. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
13. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
14. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
15. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
16. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
17. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
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23. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
24. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
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28. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
29. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
30. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
31. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
32. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
33. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
34. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
35. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
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37. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
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39. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
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47. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
48. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
49. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11
50. vrsta	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11

Prof. dr. Smalcelj

ZAJEDNICA ZA PROMET STOKOM I STOČNIM PROIZVODIMA
ODSJEK ZA PROIZVODNJI — PODODSJEK ZA TOV I KRMIVA

KRATKE UPUTE
o pripremi dnevnih obroka hrane za svinje upotrebom
krepkih krmiva
(sačme, pogača uljarica i t. d.)

Sastavio:
Prof. MARSIC MILAN
predsjednik pododjelja za tov i krmiva

Sea prava pridržana.

DR. ALBERT OGRIZEK, sveuč. prof.

Razumno pašnjarstvo

sa 9 slika

ZAGREB

TISAK ZADRUŽNE STAMPARIJE U ZAGREBU

*Prof. D. Posajir
vet. inspektor
u svah paenje
Šmalcelj*

Sveuč. profesor dr. ing. IVAN ŠMALCELJ:

HRANITBA I TOV SVINJA

ZAGREB 1943.

PERADARSTVO

NAPISAO

JULIJE OBERHOFER

GOSPODARSKI SAVJETNIK U N.

VLASTITA NAKLADA



*Prof. D. Posajir
Belko
Zagreb 1944.*

ZAGREB 1942.

ZADRUŽNA TISKARA, ZAGREB, BERNOLAVIČEVA ULICA BROJ 10

Agencija knjižnica u Zagrebu
Centar za knjižnično stvaralaštvo

A - 2016
sv. 669 D-b

567

ŠMALCELJ



GOVEDARSTVO

Dr IVAN ŠMALCELJ

567

GOVEDARSTVO

GOSPODARSKA POUKA

33

ZAGREB

1943

Doc. Dr. Ivan Šmalcelj:

Poljoprivredna knjižnica
Pri Polj. univ. Zagreb
343 -
D-a

Hranidba krava muzara

2322

KNJIŽNICA
MINISTARSTVA POLJOPRIVREDE
POSREDOVANJE
KUPOVINE I PROMETA
Skupina 111 Broj 2382

ZAGREB 1942

TISKARA C. ALBRECHT (P. ACINGER), ZAGREB, RADICEVA UL. 28

Dr. Ivan Šmalcelj

Malo svinjogojstvo

Sa 29 slika

KNJIŽNICA

MINISTARSTVO SELSKOG GOSPODARSTVA
I
POSREDOVANJE U PROMETU
S
POLJOPRIVREDNIM PROIZVODIMA

Štampa

Broj

Zagreb 1943.

Tiskara Milana Šutlaya

Poljoprivredna knjižnica
Pri Polj. šum. fakul. u Zagrebu

B-106

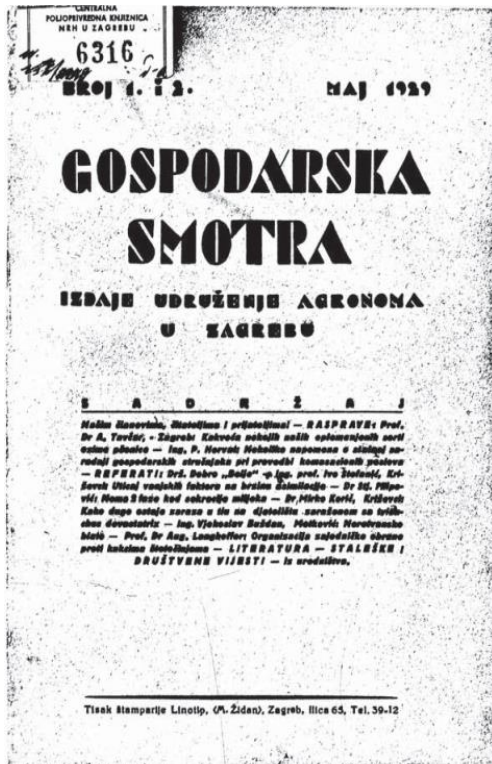
malo
svinjogojstvo

DR IVAN
ŠMALCELJ



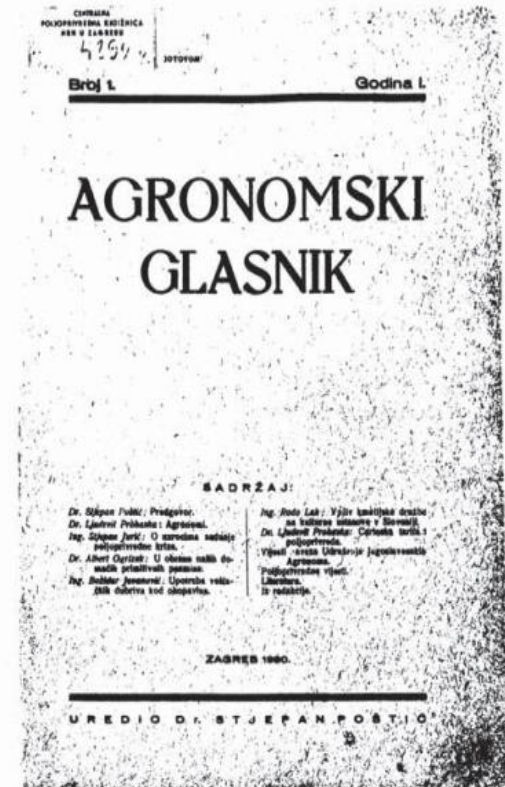
Journal

- 1924 – Agronomy association 35 members, 1927 – 155 members
- 1929 – Agriculture review – journal of Agronomy association
- 1939 – Agriculture Conspectus Scientifics (ACS) – scientific journal of FAF



1930 -1945

10th doctors in filed of animal production



Department history from 1945. to 1960.

Employees join department in the 1950s

1. Dr.sc. Branko Horvat, 1924.
 2. Stana Barić from 1945.
 3. Hrvoje Zlatić from 1949.
 4. Ivan Baltzer form 1954.
 5. Teodor Požežanac 1954.
 6. Milovan Pešut, 1958.
- **Students' population has grown from 300 (1938) to 1423 subjects in 1958**

Prof. dr.sc. Branko Horvat

- 1898. – 1969.
- 1920.-1923. specialised nutrition at **Martin-Luther-University Halle-Wittenberg**
- 1923. dissertation Die Schweizer Schafe im Haustiergarten des Tierzuchtinstitutes der **Martin-Luther-University Halle-Wittenberg**
- 1945. – lecturer of Animal Nutrition
- 1948. – assistant professor
- 1959. – full professor tenure
- 1960. – promote cooperation between The Department and compound feed industry and large state farms
- 1961. – founder of The Institute for animal nutrition and feed technology
- 1963. – established interdisciplinary master's study „Animal Nutrition and Feed Technology

Cooperation between Department and practice

- Industrial livestock and compound feed industry boost department in following decades
 - All aspects of feed manufacturing advanced rapidly at the second half of the 20th.
 - The first compound feed was thought to have been used by the British 1914.
- The easiest way to application of animal nutrition knowledge is through feed compounds
 - Feed analysis
 - Feed formulation
 - Management of feeding
- 1946. – first animal feed industry Krmiva than Kopčić
- 1960. – premix production KALINOVICA
- 1959. – KRMIVA first journal on animal nutrition and feed technology
- Field experimental station in Vnkovci and Đakovo

Nutritional textbooks in 1950s



Ing. M. STRIŽIĆ

HRANJIVA VRIJEDNOST KONCENTRIRANIH KRMIVA

•ZADRUZNA STAMPA•
ZAGREB, 1959

Nov. 28/59

Prof. I. S. POPOV

HRANIDBENE NORME I KRMNE TABLICE

8 DESETO, POSUVSO PREPRAVENOG IZDANJA
PREVELI
REGAN ING. ĐURO
I BLASIN NIKOLA



Na osnovu originalnih
KRMIVNIH NORMI I KRMIVNIH TABLICA
ODIJELE ZA KRMIVARSTVO, MOSKVA 1944

Ing. KRIVOŠIĆ MARIJAN

HRANIDBENE NORME ZA PERAD



POLJOPRIVREDNI NAKLADNI ZAVOD
ZAGREB

Dr. Ing. BRANKO HORVAT

HRANIDBA PERADI

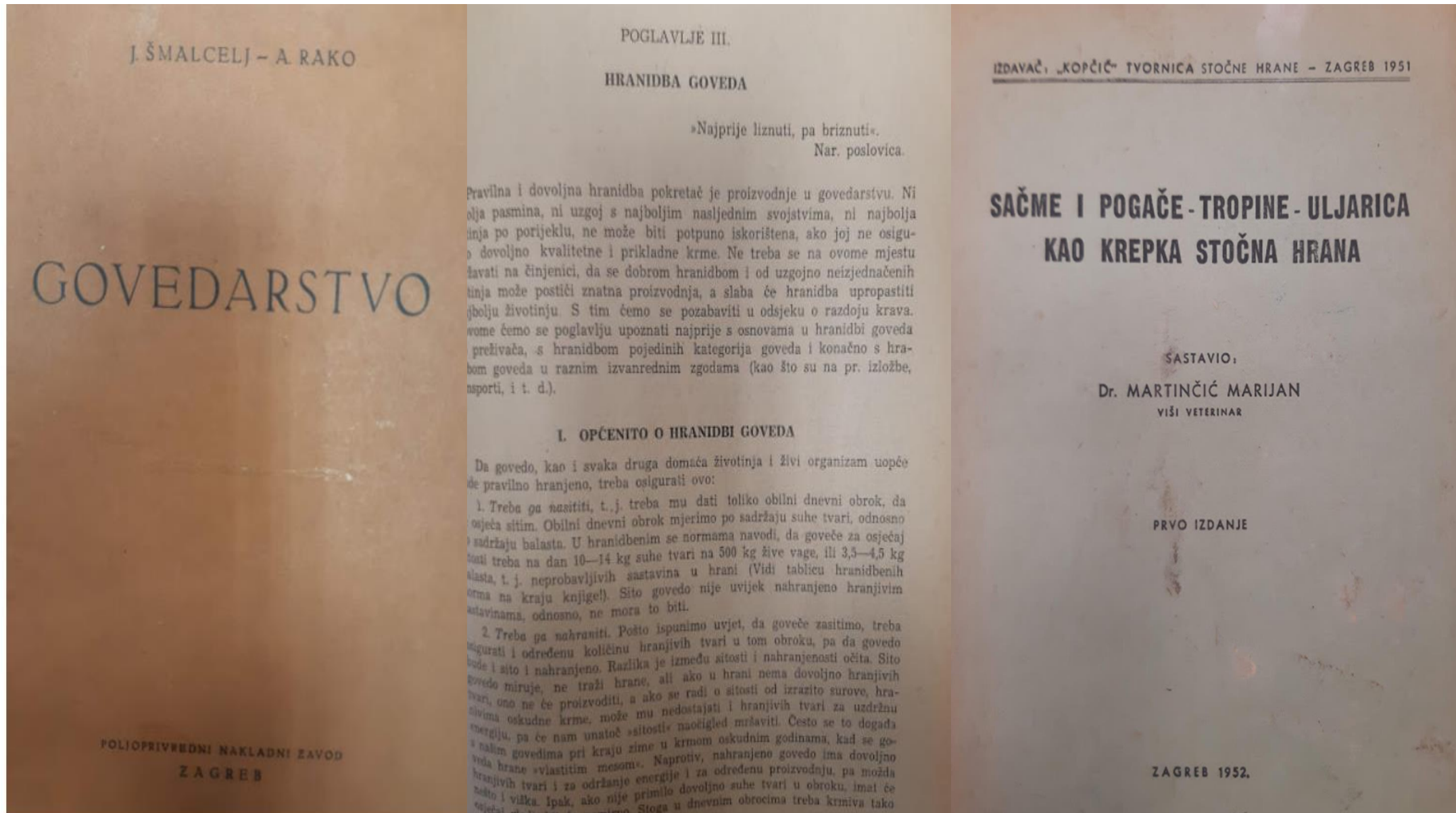
(Sa 27 slika u tekstu i 30 tabela)



ZAGREB 1950.

IZDANJE ZADRUGE ZA UZGOJ I SELEKCIJU ČISTOKRVNE
PERADI, KUNICA I KOZA S O. J. U ZAGREBU

Chapter of Nutrition in books



J. ŠMALCELJ - A. RAKO

GOVEDARSTVO

POLJOPRIVREDNI NAKLADNI ZAVOD
ZAGREB

POGLAVLJE III.

HRANIDBA GOVEDA

»Najprije liznuti, pa briznuti«.
Nar. poslovica.

Pravilna i dovoljna hranidba pokretač je proizvodnje u govedarstvu. Ni oja pasmina, ni uzgoj s najboljim nasljednim svojstvima, ni najbolja linja po porijeklu, ne može biti potpuno iskorištena, ako joj ne osiguro dovoljno kvalitetne i prikladne kreme. Ne treba se na ovome mjestu žavati na činjenici, da se dobrom hranidbom i od uzgojno neizjednačenih tinja može postići znatna proizvodnja, a slaba će hranidba upropastiti jbolju životinju. S tim ćemo se pozabaviti u odsjeku o razdoju krava. wome ćemo se poglavljju upoznati najprije s osnovama u hranidbi goveda preživača, s hranidbom pojedinih kategorija goveda i konačno s hranidbom goveda u raznim izvanrednim zgodama (kao što su na pr. izložbe, naspoti, i t. d.).

I. OPĆENITO O HRANIDBI GOVEDA

Da govedo, kao i svaka druga domaća životinja i živi organizam uopće de pravilno hranjeno, treba osigurati ovo:

1. Treba ga nasititi, t. j. treba mu dati toliko obilni dnevni obrok, da osjeća sitim. Obilni dnevni obrok mjerimo po sadržaju suhe tvari, odnosno sadržaju balasta. U hranidbenim se normama navodi, da goveče za osječaj treba na dan 10—14 kg suhe tvari na 500 kg žive vage, ili 3,5—4,5 kg balasta, t. j. neprobavljivih sastavina u hrani (Vidi tablicu hranidbenih norma na kraju knjige!). Sito govedo nije uvijek nahranjeno hranjivim sastavinama, odnosno, ne mora to biti.

2. Treba ga nahraniti. Pošto ispunimo uvjet, da goveče zasitimo, treba osigurati i određenu količinu hranjivih tvari u tom obroku, pa da govedo bude i sito i nahranjeno. Razlika je između sitosti i nahranjenosti očita. Sito govedo miruje, ne traži hrane, ali ako u hrani nema dovoljno hranjivih tvari, ono ne će proizvoditi, a ako se radi o sitosti od izrazito surove, hranjivim sastavinama oskudne kreme, može mu nedostajati i hranjivih tvari za uzdržanu energiju, pa će nam unatoč »sitosti« naočigled mljaviti. Često se to događa u našim govedima pri kraju zime u krmom oskudnim godinama, kad se goveda nahranjuju »vlastitim mesom«. Naprotiv, nahranjeno govedo ima dovoljno energije i za održanje proizvodnje, pa možda i za ostvarenje viška. Ipak, ako nije primilo dovoljno suhe tvari u obroku, imat će teško i viška. Stoga u dnevnim obrocima treba krmiva tako

IZDAVAČ: „KOPČIĆ“ TVORNICA STOČNE HRANE - ZAGREB 1951

SAČME I POGAČE - TROPINE - ULJARICA KAO KREPKA STOČNA HRANA

SASTAVIO:

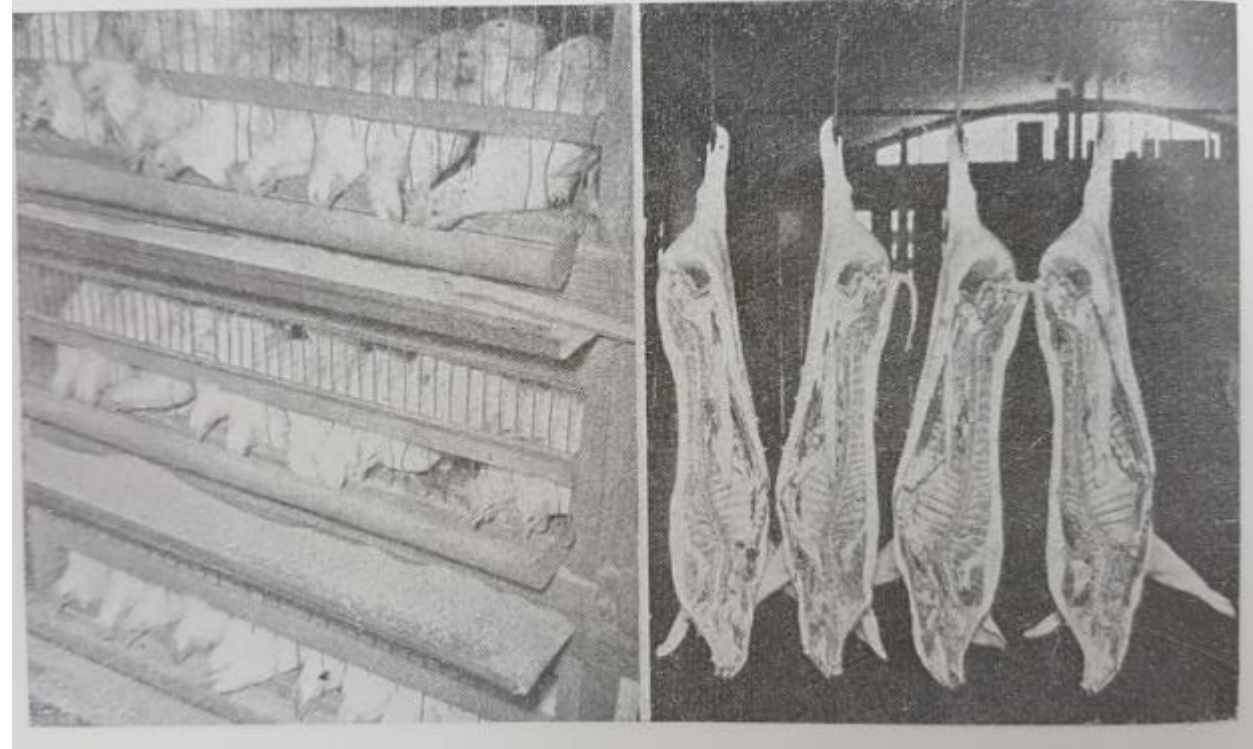
Dr. MARTINČIĆ MARIJAN
VIŠI VETERINAR

PRVO IZDANJE

ZAGREB 1952.

Reserch

- Chemical composition and nutritive value of
- fish meal,
- rapeseed meal,
- pea and faba bean grain
- feeding high productive introducing
- strain of swine
- silage making



Changes that support fast development in the 1960s

- Rapid growing of **industrial production** on state farms and compound feed industry
- 08.12.1959. separate **Agriculture from Faculty** of Agriculture and Forestry
- 1960. established studies: **Animal Husbandry**, Plant production and Agro-economy
 - Different courses of Animal Nutrition for each studies
- 1961. – **The Institute for animal nutrition and feed technology**
- 1963. – Interdisciplinary master's study „**Animal Nutrition and Feed Technology**“
- Providing **least cost feed formulation** on the basis of regular feed analysis and price that satisfied specific level of nutrient requirements

Department and Institute rapid growing in 1960s

Member of department

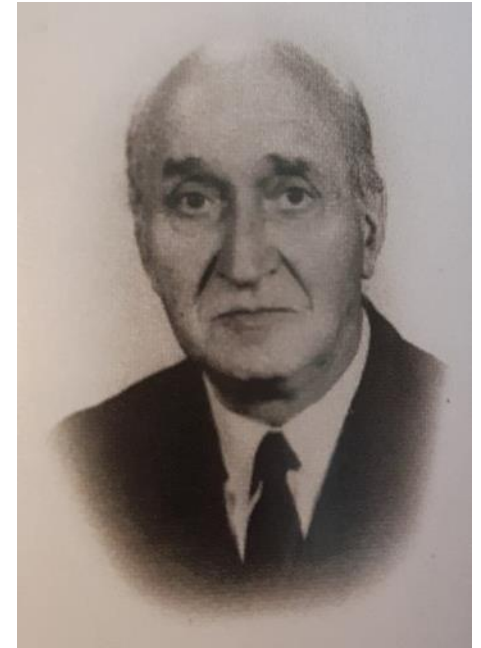
1. Dr.sc. Branko Horvat
2. Stana Barić from 1945.
3. Hrvoje Zlatić from 1949.
4. Ivan Baltzer form 1954.
5. Teodor Požežanac 1954.
6. Milovan Pešut 1958.

New members of department and Institute

1. Tajana Crnojević, PhD in 1969.
2. Braun Boris – PhD in 1967.
3. Stevo Jančić – PhD in 1963.
4. Zdravko Crnojević – PhD in 1965.
5. Željko Berić – PhD in 1966.
6. Dr.sc. Milovan Pešut – PhD in 1966.
7. Dr.sc. Zvonko Robić – PhD in 1968.

Prof. dr. sc. Hrvoje Zlatić

- Born in 1923. - 1998.
- He was graduate in 1949.
- 1950. - 1989. staff member of Department Animal Nutrition
- He was awarded PhD degree in 1958.
- Training of Swine Nutrition six months in GB, and USA
- Tough courses in Animal Nutrition and Swine Nutrition
- Head of postgraduate study „Animal Nutrition and Compound Feed Technology”
- Head of Department of Animal Nutrition and Institute for Animal Husbandry and Zootechnic
- He was valued member of professional societies (Krmiva, Agronomsko društvo) and International Animal Husbandry Association. EAAP Vice president
- He mentoring 15 PhD, and 32 MS students



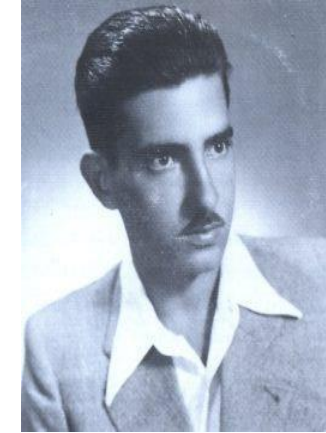
Prof.dr.sc. Ivan Balzer –inovative chemist

- Graduated Chemistry in 1938.
- Earned PhD in 1959.
- Chemical methods for measurement of silage quality in 1957.
- Amino-acid analysis, biogenic elements, carotenoids, hormones, and
- First analysis of mycotoxins in 1960s in cooperation with USA scientists
Etc.
- In his 90th makes chemical analysis and cosmetic products



Prof.dr.sc. Boris Braun (1920. – 2018.)

- Spent three years (1942. – 1945.) in the concentration camp Auschwitz, Jaworzno and Buchenwald
- BS degree in 1950., 4 month training in The USA in 1957.
- Joined to the Department in 1968.
- Professor in Poultry Husbandry
- His primary research focus was in the field of chicken nutrition
- 1977. Federal inspector in Maribor – Slovenia



- **Irena Štoter (1924. – 2019.)**

- Assistant in field of Animal Nutrition
- Expert for microscopic assessment of ingredients content in compound feed



Prof.dr.sc. Tajana Černy (1931.-2015.)



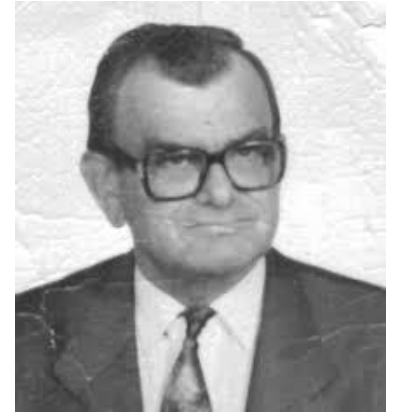
- BS degree in 1956.
- 1956. – 1962. feed analysis in first feed compound industry
- 1962 . joint to Institute and 1963. to the department
- MS in 1969., PhD in 1988.
- She spent all working time as chair of feed analysis laboratory in the department
- Under her guidance, the laboratory has established long term partnerships with industry in the area of feed nutritive value and least cost formulation

Prof.dr.sc. Stevo Jančić (1920. -2012.)

- Professor of swine, sheep and goat production
- 1952. – 1957. he was at department of Livestock moved to Animal Nutrition in 1963
- Perform 15 experiments on swine and sheep in this period awarded scholarship in USA for six months.
- He is author of 93 journal papers and over 100 other publication

Prof.dr.sc. Željko Berić (1931. - 2005.)

- Professor of Poultry Husbandry and Head of department,
- main research activity in the field of poultry nutrition



Prof.dr.sc. Zdravko (Crnojević) Černy • (1933. - 1996.)

- Professor of swine production
- Chair of Department and Head of Institute, Dean of the Faculty
- Member of the decision making bodies
- He continue and expand collaboration of Department with industry



Department in 70th and 80th

- Hold steady develop in the term of staff, equipment and consulting service to industry,
- MS and PhD studies -foreign students from Non-Aligned countries, BH, Slovenia and Kosovo
- Department for Anima Nutrition and Zootechnic
- Integration of livestock's departments into Institute for Animal Husbandry
- Integration of Institutes into Faculty of Agriculture Sciences
- Organizaton EAAP 1981. conference

Department in 70th and 80th

New academic staff:

- | | | |
|----------------------|---------------------|-------------------------|
| 1. Stjepan Mužic | 2. Roman Božac | 3. Zvonko Robić |
| 4. Zlatko Stilinović | 5. Vlatko Rupiĉ | 6. Vesna Paviĉ |
| 7. Radovan Zebec | 8. Dejan Krnjaić | 9. Branko Liker |
| 10. Vesna Belošević | 11. Darko Grbeša | 11. Boro Mioĉ |
| 12. Jasna Pintar | 13. Źeljka Laškariĉ | 14. Maja Sikiriĉ Dutour |

- International cooperation with FAO, Roweth Institute Aberdeen
- Research topics: non- soybean legumes in animal nutrition, protein and minerals realised in rumen, fungi by products etc.

Department in 90th and 21th century

- Faculty is reorganized in 1992. Faculty of Agronomy
- Organization units departments instead Institute
- Department of Animal Nutrition
- Bs and Ms study of Animal Production
- Professor Tajana Černy < 1996.> Darko Grbeša
- Tajana Černy and Darko Grbeša cofounder of symposium KRMIVA
- Integration of Animal Nutrition and Chair for Poultry Husbandry in 1997.
- 2005. Master study Animal Feeds and Nutrition established by Darko Grbeša

Present state

13 employees – 7 academic staff

40 scientific and developing and VIP projects

Two research team –poultry and animal nutrition

Research topics – Croatian breeds of chicken, turkey and goose

Croatian hybrids – kinetic of starch digestibility and phytonutrients

106 papers in WoS

1136 citations

49 books

50% students of Animal Nutrition and Feeds has been awarded as the best students



Darko Grbeša



Zlatko
Janječić



Jasna
Pintar



Goran
Kiš



Kristina Kljak



Dalibor Bedeković



Marija Duvnjak

Staff publications

Member of staff	Scientific papers Web of Science	Citations in Scholar	Books and chapters in books
Stjepan Mužic	13	88	9
Darko Grbeša	28	480	17
Zlatko Janječić	19	222	5
Jasna Pintar	10	21	1
Goran Kiš	6	55	3
Kristina Kljak	16	151	
Dalibor Bedeković	11	78	1
Marija Duvnjak	4	9	

Hvala lijepa na pažnji



Thank You Very Much !