How can the European Federation for Animal Science support the livestock sector in finding solutions for the challenges it faces?

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EAAP European Federation of Animal Science

#ISAS_2023
INTERNATIONAL SYMPOSIUM ON ANIMAL SCIENCE 18-20 SEP.2023. NOVI SAD, SERBIA WWW.ISASEVENT.COM

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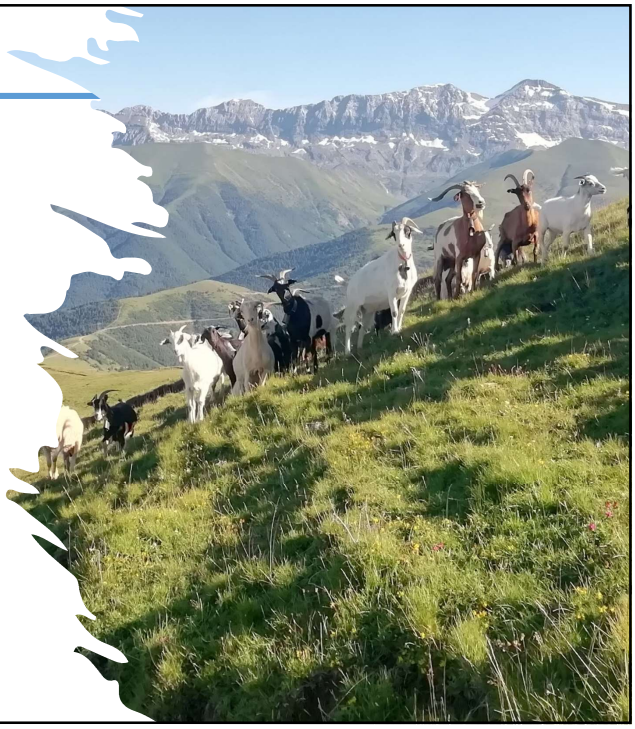
Outline

1. The European livestock sector
2. The challenges
3. The R&D priorities
4. The European Federation of Animal Science



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1. The European livestock sector

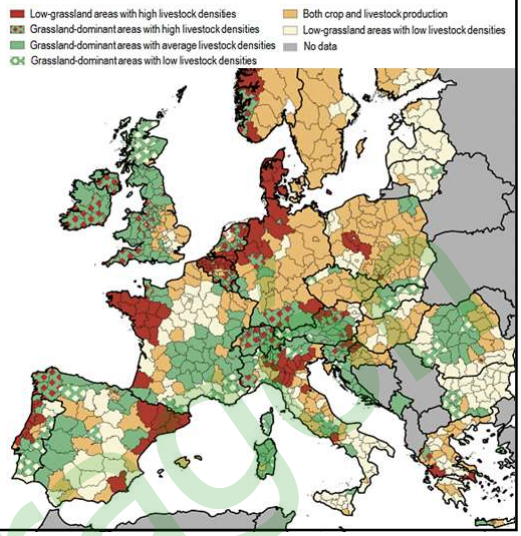
Major role in European agriculture

38.4% of the total agricultural output in 2020 → 159 billion €

1.9% of the active population ≈ 4 million people

with large regional differences

Typology of European livestock farming areas (INRAe, Eurostat 2010)



Large diversity in livestock farming systems

Associated to agricultural area and permanent grasslands

→ ≠ livestock species, farm management and products
→ ≠ impacts of and services provided by LFS

≈ challenges, ≠ solutions?

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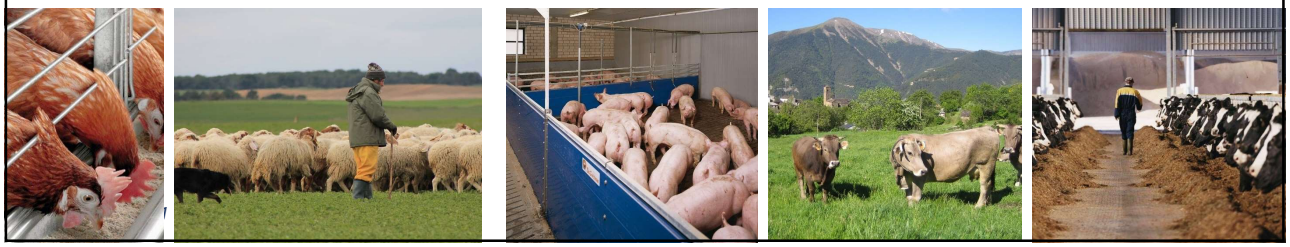
2. Challenges to the European (and global) livestock sector

1. Demand of high quality, nutritious and safe animal source food for a growing global population
2. Production systems must be resource-efficient, welfare- and environment-friendly, and guarantee the livelihood of farmers

+ COVID-19, inflation, Ukraine war, adverse weather events…



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1. Demand of high quality, nutritious and safe animal source food

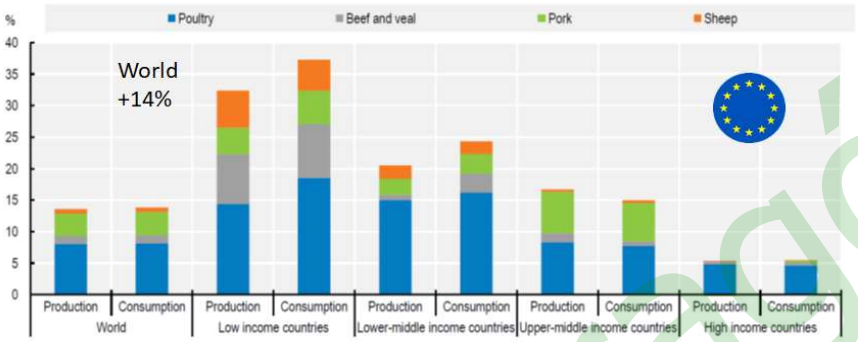
- **Growing demand of ASF**

→ global population: 9.7 billion by 2050 (UN, 2022)

→ large regional disparities

driven by population growth rate and structure, income and consumer preferences

Growth in meat production and consumption on a protein basis, 2021 to 2030



(OECD-FAO Agricultural Outlook, 2021)

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- **Demand for nutritious, healthy and safe food**

ASF: 33% of protein and 17% of energy consumption globally

→ **ASF in sustainable, healthy diets:** limited according to EAT-Lancet guidelines

- alleged link to chronic disease debated *(diet + processing + lifestyle)*
- high-quality protein and key nutrients to prevent malnutrition

(Leroy et al., 2022)

→ **Anti-microbial resistance:**

prophylactic, (sub-) therapeutical and metaphylactic AMU in livestock

resistance genes in bacterial populations: livestock → humans

- AMU reduction - One Health approach

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2. Sustainability of livestock production systems

- **Contribution to UN Sustainable Development Goals**
  - food security and nutrition
  - economic development and provision of livelihoods
  - animal and human health
  - environment, climate and natural resources

(Mottet et al., 2018)

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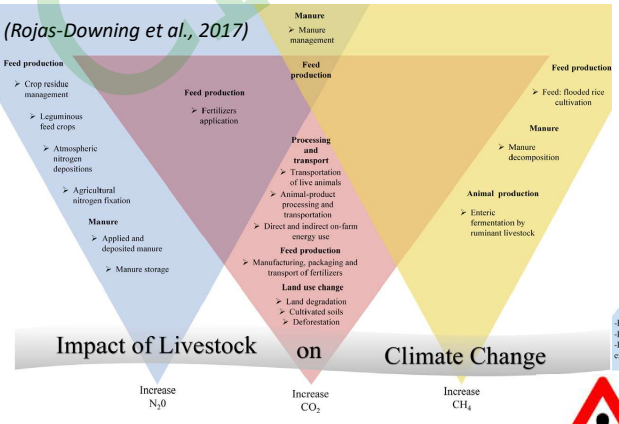
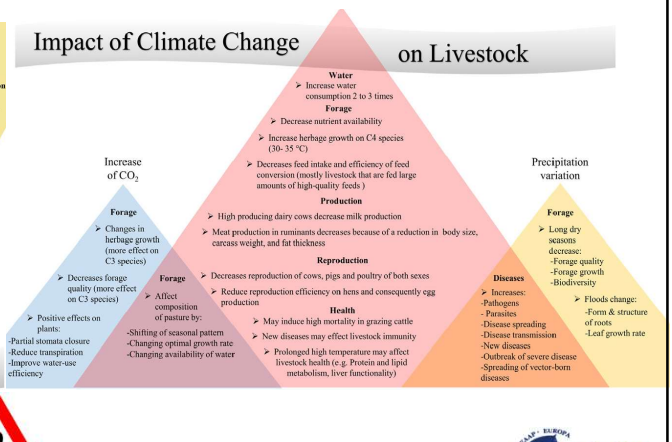
• Mitigation of and Adaptation to Climate Change

Target of the **COP26 Climate Change Conference** (2021) for 2030:
- reduce methane emissions by 30%
- limit global warming +1.5 °C above pre-industrial levels

(Rojas-Downing et al., 2017)





*Call for **mitigation** strategies*

*Call for **adaptation** strategies*

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3. R&D priorities for the European livestock sector

European Green Deal: carbon neutrality by 2050

Farm to Fork strategy: specific goals for agriculture up to 2030

*"development of **sustainable and competitive food systems** with **neutral environmental impact**, which help to **mitigate climate change** and **ensure food security, quality and affordability**, and a **sustainable livelihood for primary producers**"*

R&D priorities

1. **Maximize the resource use efficiency**
2. **Improve animal health and welfare**
3. **Reduce the competition with human-edible food**
4. **Reduce emissions from LFS**
5. **Promote circularity of agro-ecosystems**
6. **Enhance the positive externalities of LFS**

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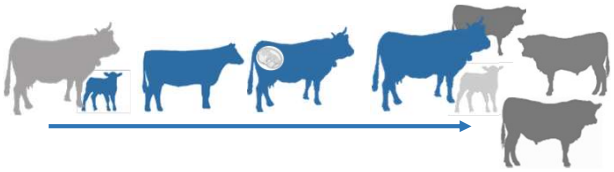
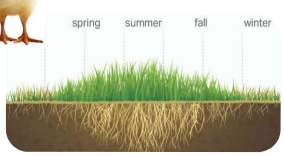
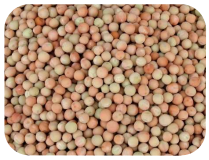
1. Maximize the resource use efficiency

- **Improve productivity per head**
  - reproductive efficiency
  - product yield + quality
  - → lifetime performance
- **Improve feed efficiency**
  - breeding
  - nutritional management
    - diet composition - requirements
      - herd management
      - individually-tailored diets
    - alternative diets
      - novel feeds
      - forages







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2. Improve animal health and welfare

synergies and trade-offs

- **Improve animal health**
  - genetics: genome - epigenome + microbiome
  - control programs
  - adequate feeding, management…
- **Improve animal welfare**
  - genetics, nutrition, reproduction, management
  - ≠ environments, management conditions
  - birth to slaughter

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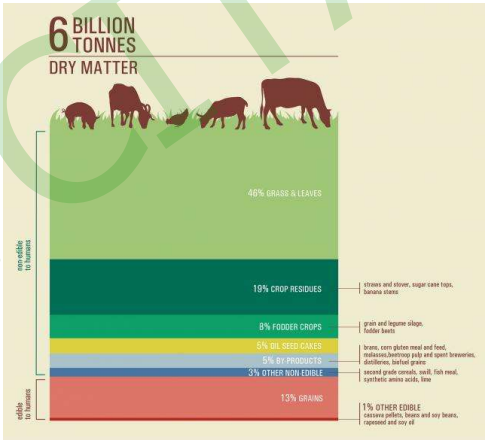
3. Reduce competition with human-edible food

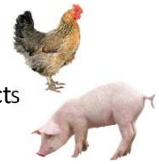


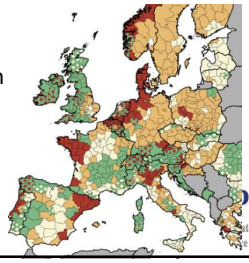
Global livestock feed DM intake (FAO, 2017)

- Food security
- Feed security - Feed sovereignty
  EU dependency on imported protein

Alternative feed sources

- insects, algae
- local forage crops (legumes-N)
- waste, industry and agricultural by-products
- grasslands
  - 73 million ha permanent grasslands (40% UAA EU)
  - only ruminants can convert them into human-edible protein





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4. Reduce emissions

How to mitigate livestock methane and ammonia production in LFS?

- **Breeding**: low heritability, but cost-effective and cumulative (CH_4)
- **Nutritional management**
  - highly digestible feeds (CH_4)
  - seaweed and micro-algae (CH_4)
  - feed additives (CH_4)
    synthetic: nitrate, 3-NOP
    natural: oils, saponins, tannins
  - legume forages (CH_4, NH_3)
  - precision feeding (CH_4, NH_3)
- **Manure treatments and management**
  - anaerobic digestion (CH_4)
  - acidification (NH_3)


(CRV)


(All about feed)


(Pomar and Remus, 2019)


(LIFE ARIMEDA)

(EIP-AGRI, 2017)

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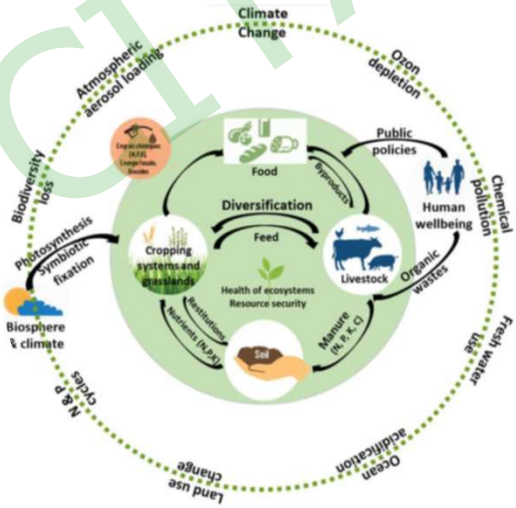
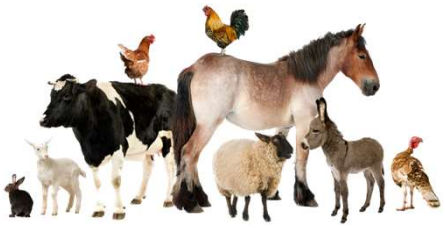
5. Promote circularity of agro-ecosystems



(ATF SRIA, 2021)



- **Efficient conversion** of local crops (grains, forages), grasslands and by-products (low opportunity cost) into human-edible protein
- Production of manure – **restitution of nutrients** to the soils

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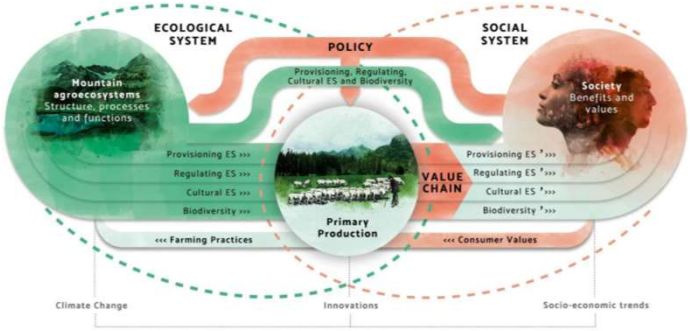
6. Enhance the positive externalities of LFS



(Bernués et al., 2017)

Livestock farming practices
promoting C sequestration
enhancing biodiversity
supporting cultural landscapes
reducing environmental hazards…

Multifunctionality

Ecosystem services:

- Provisioning ES: material outputs (€)
- Non-Provisioning ES (public goods)
  - regulating ES: *biophysical processes - climate, water*
  - supporting ES: *photosynthesis, nutrient cycling*
  - cultural ES: recreational, spiritual, aesthetic

→ benefits perceived by society (values)
→ practices rewarded by policies (eco-schemes)

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… promising pathways towards the sustainability and resilience of livestock farming systems

↑↑↑

exchange of experience and collaboration amongst **science, industry and society**

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4. The supporting role of the European Federation of Animal Science (EAAP)

What is the EAAP?

The **network** of animal scientists and professionals in **Europe and the Mediterranean basin** since 1949

35 Member Countries of the larger Europe

~ 5500 individual members

~ 900 research and scientific institutions

Austria	Finland	Latvia	Romania	Türkiye
Belgium	France	Lebanon	Serbia	Ukraine
Bulgaria	Germany	Lithuania	Slovak Republic	United Kingdom
Croatia	Greece	Luxembourg	Slovenia	Uzbekistan
Cyprus	Iceland	Netherlands	Spain	
Czech Republic	Ireland	Norway	Sweden	
Denmark	Israel	Poland	Switzerland	
Estonia	Italy	Portugal	Tunisia	

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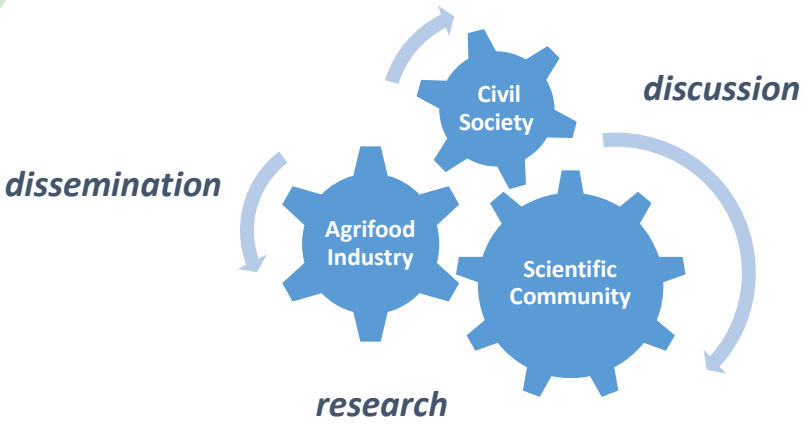
Our mission

To promote **research, discussion and dissemination** of high quality and relevant animal science findings amongst **scientific communities, the agrifood industry, civil society and groups with interests in sustainable livestock production**.



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Our governance

General Assembly

- Representatives of **all the ordinary members**
- One meeting per year
- Programme, budget, commissions, membership

Serbia: Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia

MINISTRY OF AGRICULTURE, FORESTRY AND WATER MANAGEMENT OF THE REPUBLIC OF SERBIA

Slovak Republic: Slovak University of Agriculture

SUA Slovak University of Agriculture in Nitra

Croatia: Ministry of Agriculture, Fisheries and Rural Development

MINISTRY OF AGRICULTURE

Council

- President and ten Council Members, representative of country groups
- Day-to-day business, meetings throughout the year

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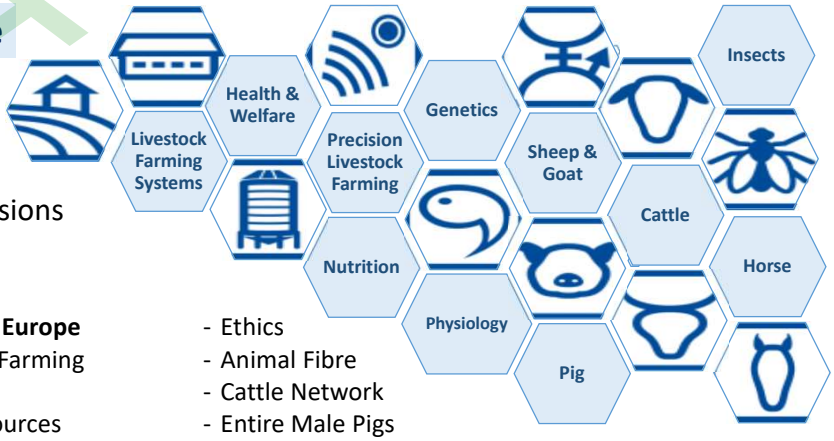
Our scientific structure

Scientific Committee

11 Study Commissions



Working Groups (14)

- **Central and Eastern Europe**
- Mountain Livestock Farming
- Mediterranean
- Animal Genetic Resources
- Energy and Protein Metabolism
- Animal behaviour
- Lamb and kid survival
- Ethics
- Animal Fibre
- Cattle Network
- Entire Male Pigs
- Aquaculture
- Interstallion
- Camelids

Young EAAP Early Career Researchers (<38 years, < 10 yr PhD)
~ 400 members

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Services to members

Annual meetings

https://eaap2023.org/
Lyon, France

- >2300 participants
- 99 Sessions + Plenary
- > 1900 presentations (1200 theatre + 700 posters): *available online*
- 20 Scholarships (<38 yr)
- Social events
- Study Tours

https://eaap2024.org/
Florence, Italy

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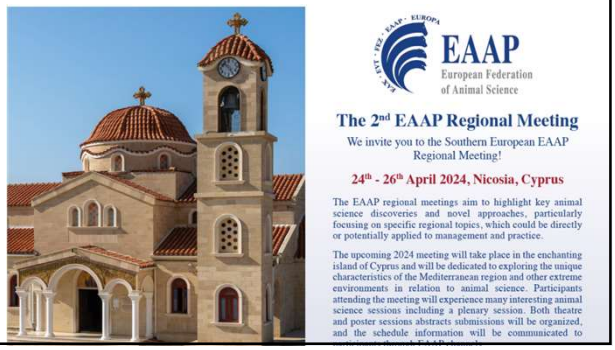
Regional meetings

1st EAAP Regional Meeting
26th - 28th April 2023, Nitra, Slovakia
https://regional2023.eaap.org/

2nd EAAP Regional Meeting
424th - 26th April 2024, Nicosia, Cyprus
https://regional2024.eaap.org/



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Dissemination

Website www.eaap.org

Social Media

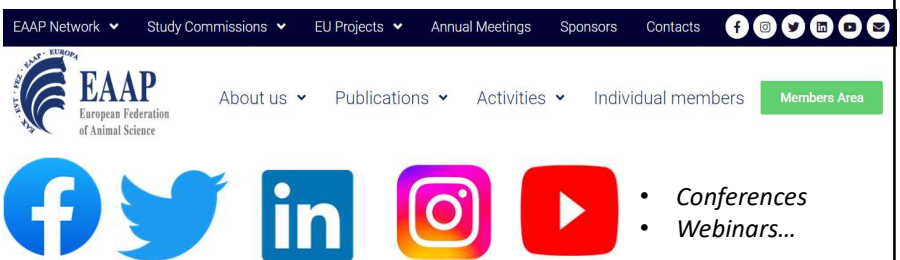
Youtube channel

EAAP publications

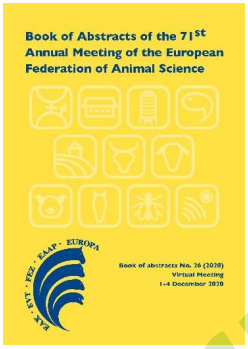
Newsletter

+ *Croatian*
+ *Polish*
+ *German*
+ *Italian*
+ *Portuguese*
+ *Romanian*
+ *Slovakian,*
+ *Slovenian*
+ *Spanish*

>3000 downloads



- *Conferences*
- *Webinars…*



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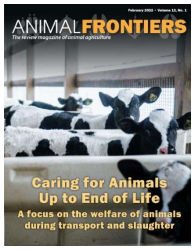
Our journals

Animal Frontiers

https://academic.oup.com/af



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WORLD ASSOCIATION for ANIMAL PRODUCTION

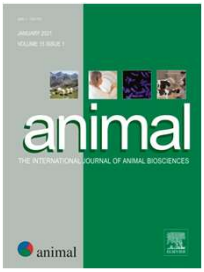
AMERICAN SOCIETY OF ANIMAL SCIENCE

American Meat Science Association

The *animal* family of journals

https://www.sciencedirect.com/

animal



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bsas british society of animal science

INRAE science for people, life & earth

Responsible publishing "for scientists, by scientists"

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European Commission

EU Projects

- communication
- dissemination
- websites
- training courses
- capacity building workshops
- scientific sessions in conferences

Rumigen – TOWARDS IMPROVEMENT OF RUMINANT BREEDING THROUGH GENOMIC AND EPIGENOMIC APPROACHES
RES4LIVE – ENERGY SMART LIVESTOCK FARMING TOWARDS ZERO FOSSIL FUEL CONSUMPTION
TECH CARE – Integrating innovative TECHnologies along the value Chain to improve small ruminant welfARE management
HoloRuminant – Understanding microbiomes of the ruminant holobiont
PPILOW – Poultry and Pig Low-input and Organic production systems' Welfare
Smarter – SMAll RuminanTs breeding for Efficiency and Resilience
intaqt – one quality
BovReg – Understanding cattle genomes
GENE-SWitCH
VETBIONET – Veterinary Biocontained research facility Network
EAAP – European Federation of Animal Science

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Our international collaborations

- International organizations
- Our national members…
- Other scientific societies

- Organization of Annual Meetings
- Dissemination & Publications
- Joint Projects, Sessions and Symposia
- Exchange Invited Speakers & Scholarships

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Opportunities within the European Federation of Animal Science

From a European and global perspective, the **exchange of experience and collaboration** amongst science, industry and society is **the only way forward** in an increasingly globalized world

animal scientists, students, technicians
and stakeholders in the livestock farming sector
are encouraged to join the EAAP network

Individual Membership https://members.eaap.org/apply

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Acknowledgements

Institutional Members of the EAAP

- Serbian Ministry of Agriculture, Forestry and Water Management
- Slovak University of Agriculture
- Croatian Ministry of Agriculture, Fisheries and Rural Development

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SUA Slovak University of Agriculture in Nitra
MINISTRY OF AGRICULTURE

Organizers of the International Symposium on Animal Science

- Faculty of Agriculture, University of Novi Sad, Serbia
- Faculty of Agriculture, University of Belgrade, Serbia
- Research Institute for Animal Production, Nitra, Slovakia
- Faculty of Agrobiotechnical Sciences, Osijek, Croatia
- Faculty of Agriculture and Food Sciences - Sarajevo, Bosnia and Herzegovina
- Biotechnical faculty - Podgorica, Montenegro

Hvala