



INIAV

**PARASITOLOGY LABORATORY
ACTIVITIES 2020-2022**



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15 September 2022



Instituto Nacional de
Investigação Agrária e
Veterinária, I.P.



REPÚBLICA
PORTUGUESA
AGRICULTURA

LABORATORY SERVICES

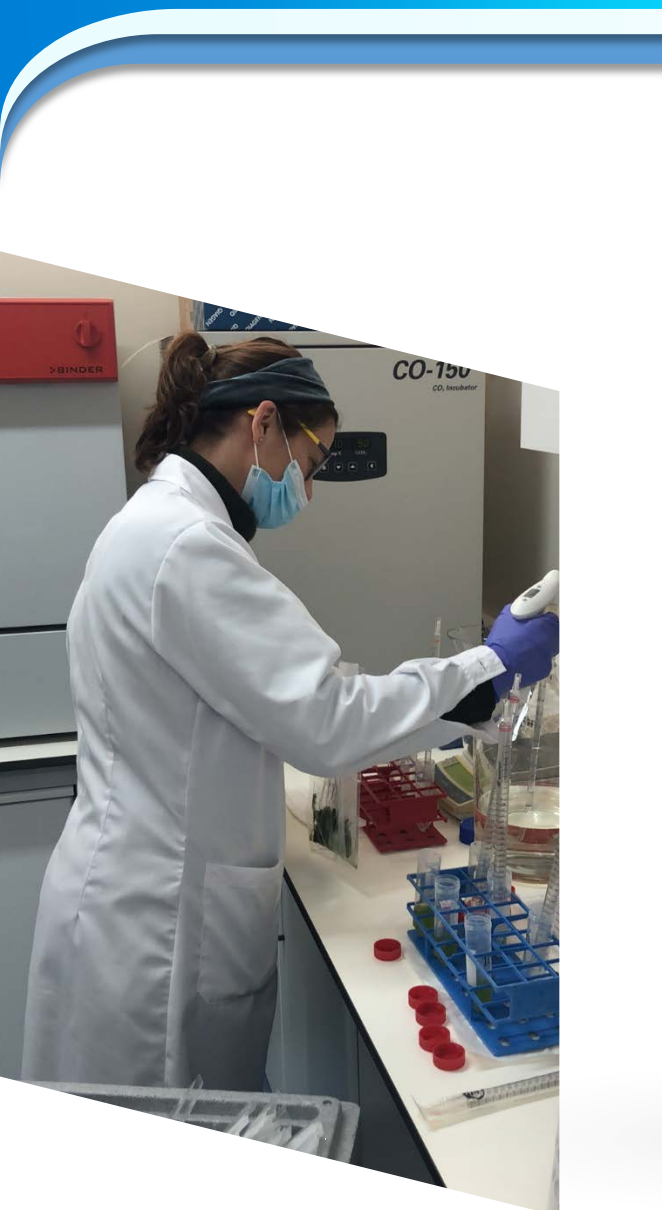


RESEARCH & INNOVATION



TRAINING, KNOWLEDGE AND TECHNOLOGIE TRANSFER

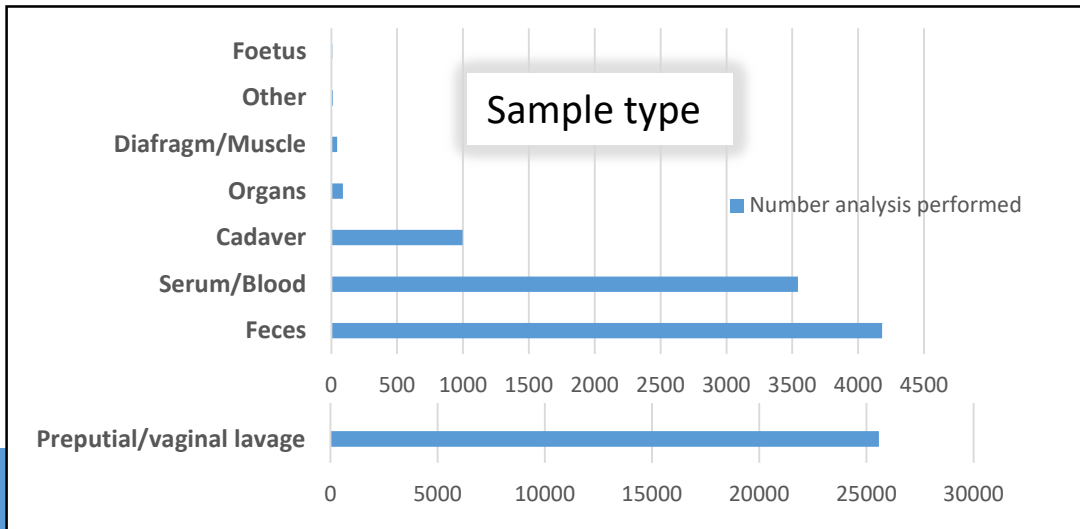
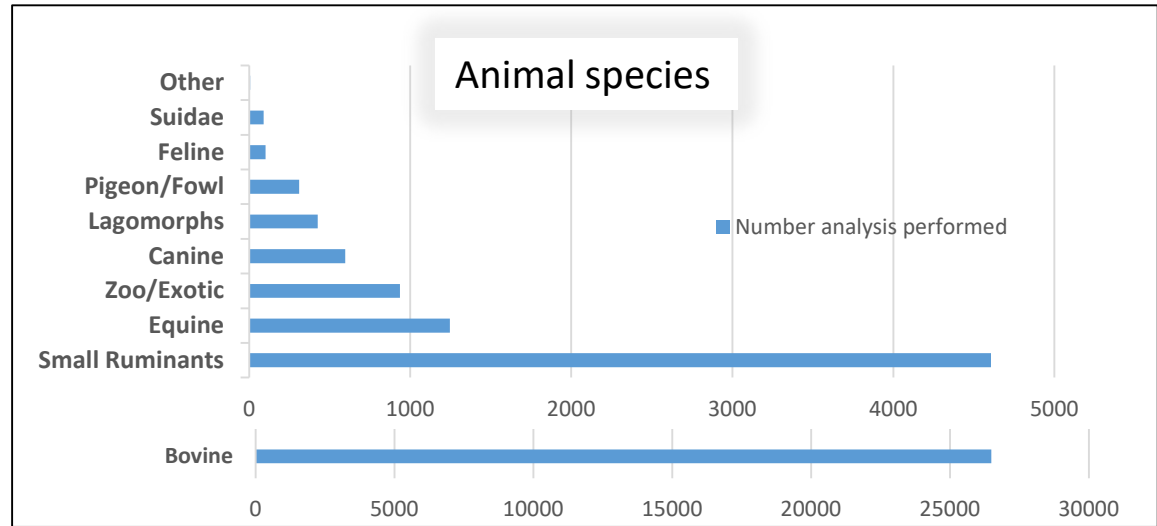
INTERVENTION AREAS LABORATORY SERVICES



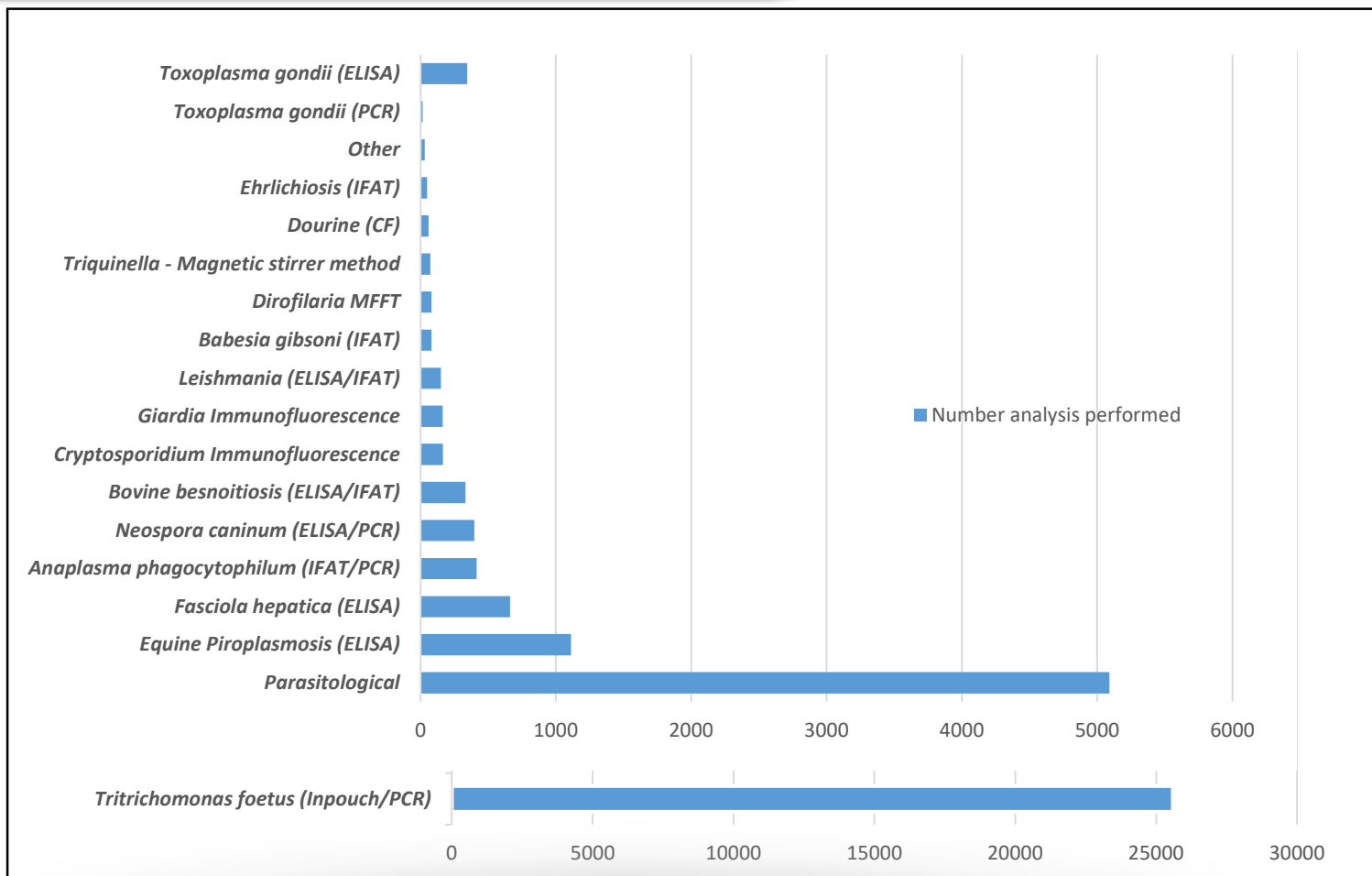
Procedure ID	Procedure Name
NP EN ISO 18743	Detection of <i>Trichinella</i> larvae in meat, artificial digestion method NP EN ISO 18743
PE001-PSA/PAR	Parasitological analysis (macro and microscopic) - organs and tissues
PE002-PSA/PAR	Morphological identification of parasites
PE003-PSA/PAR	Detection of haemoparasites, Giemsa-stained blood smear
PE004-PSA/PAR	Detection of bronchopulmonary larvae, Baermann's technique
PE005-PSA/PAR	Detection of <i>Fasciola</i> eggs, sedimentation technique
PE006-PSA/PAR	Detection of worm eggs and oocysts , flotation method
PE007-PSA/PAR	Faecal worm eggs and oocyst count , McMaster technique
PE008-PSA/PAR	Detection and identification of macroscopic GI parasites (complete digestive tract)
PE009-PSA/PAR	Detection of anti- <i>Babesia caballi</i> antibodies by cELISA
PE010-PSA/PAR	Detection of anti- <i>Theileria equi</i> antibodies by cELISA
PE011-PSA/PAR	Detection of <i>Babesia caballi</i> and <i>Theileria equi</i> , by PCR
PE012-PSA/PAR	Detection of anti- <i>Leishmania infantum</i> antibodies, IFAT
PE013-PSA/PAR	Detection of anti- <i>Leishmania infantum</i> antibodies, ELISA
PE014-PSA/PAR	Detection of <i>Leishmania infantum</i> , by PCR
PE015-PSA/PAR	Detection of anti- <i>Ehrlichia canis</i> antibodies, IFAT
PE016-PSA/PAR	Detection of anti- <i>Ehrlichia canis</i> antibodies, PCR
PE017-PSA/PAR	Detection of anti- <i>Babesia gibsoni</i> antibodies, IFAT
PE019-PSA/PAR	Detection of anti- <i>Anaplasma phagocytophilum</i> antibodies, IFAT
PE020-PSA/PAR	Detection of anti- <i>Anaplasma phagocytophilum</i> , PCR
PE021-PSA/PAR	Detection of anti- <i>Anaplasma marginale</i> , PCR
PE022-PSA/PAR	Detection of anti- <i>Besnoitia besnoiti</i> antibodies, ELISA
PE023-PSA/PAR	Detection of anti- <i>Neospora caninum</i> antibodies, ELISA
PE024-PSA/PAR	Detection of anti- <i>Neospora caninum</i> antibodies, IFAT
PE025-PSA/PAR	Detection of anti- <i>Neospora caninum</i> , PCR
PE026-PSA/PAR	Detection of anti- <i>Toxoplasma gondii</i> antibodies, ELISA
PE027-PSA/PAR	Detection of <i>Toxoplasma gondii</i> , PCR
PE028-PSA/PAR	Detection of anti- <i>Trypanosoma equiperdum</i> antibodies, CFT
PE029-PSA/PAR	Detection of anti- <i>Dirofilaria immitis</i> antigen, ELISA
PE030-PSA/PAR	Detection of microfilariae , MFFT
PE031-PSA/PAR	Detection of <i>Giardia</i> spp and <i>Cryptosporidium</i> spp, DI
PE033-PSA/PAR	Detection of <i>Trichomonas</i> spp, direct examination
PE034-PSA/PAR	Detection of <i>Tritrichomonas foetus</i> , PCR
PE035-PSA/PAR	Detection of <i>Babesia bigemina</i> , PCR
PE036-PSA/PAR	Detection of <i>Babesia bovis</i> , PCR
PE037-PSA/PAR	Detection of <i>Cytauxzoon felis</i> , PCR
PE038-PSA/PAR	Detection of haemotropic mycoplasmas, PCR
PE039-PSA/PAR	Detection of <i>Theileria annulata</i> , PCR

INTERVENTION AREAS

LABORATORY ANALYSIS 2020-2022



INTERVENTION AREAS LABORATORY ANALYSIS 2020-2022



PARTICIPATION IN INTERLABORATORY ASSAYS

Organizer	Test
Istituto Superiore di Sanità (ISS) (EURLP)	PT-01: "Detection of <i>Trichinella</i> larvae in meat intended for human consumption according to Regulations (EU) 2020/1478 and 2015/1375"
	PT-03: Identification of <i>Trichinella</i> larvae at species level by a molecular method
	PT-04: Detection of Anisakidae L3 larvae in fish fillets.
	PT-05: Detection of <i>Echinococcus</i> spp. worms in the intestinal mucosa of the definitive host
	PT-06: Detection of anti- <i>Toxoplasma</i> IgG in ovine serum samples
	PT-07: Molecular identification of Anisakid nematodes at the species level
	PT-08: Molecular identification of <i>Echinococcus</i> at the species level
	ANSES (OIE reference laboratory)
Istituto Zooprofilattico Sperimentale della Sicilia (IZSSi)	Leishmaniosis: IFAT
	<i>Theileria equi</i> : cELISA
Vetqas - APHA Scientific	<i>Babesia caballi</i> : cELISA
	<i>Ehrlichia canis</i> : IFAT
	Ectoparasitology: morphological identification
	Faecal egg count

ORGANIZATION OF INTERLABORATORY ASSAYS

- 2022: Detection of Anisakidae L3 larvae in fish fillets – Regional Laboratory Madeira

ACCREDITATION OF LABORATORY TECHNIQUES

- 2022
- Detection of *Trichinella* larvae in meat by artificial digestion method (NP EN ISO 18743:2021)
 - *Theileria equi* - cELISA
 - *Babesia caballi* - cELISA



- 2021
- WG1 of TC (National Standardization Commission) 61 for NP EN ISO 18743:2021 - (ISO 18743:2015 - Microbiology of the food chain— Detection of *Trichinella* larvae in meat by artificial digestion method)
 - Revision of portuguese standards for the detection of *Trichinella* larvae in meat and for the official recognition of laboratories issued by DGAV (competent authority)

PARTICIPATION IN RESEARCH PROJECTS

NATIONAL PROJECTS

- 2018-2022: MERINOparasite-Identification of genetic markers associated with resistance to internal parasites in the Merina Branca sheep breed using the OvineSNP50 Beadchip array (FCT-PTDC/CVT-CVT/28798/2017) <https://projects.iniav.pt/merinoparasite/en/>



INTERNATIONAL COOPERATION PROJECTS

- 2020-2022: OHEJP TOXOSOURCES: *Toxoplasma gondii* sources quantified
- 2020-2022: OHEJP MEmE Multi-centre study on *Echinococcus multilocularis* and *Echinococcus granulosus* s.l. in Europe: development and harmonisation of diagnostic methods in the food chain Funding
- 2020-2022: OHEJP PARADISE Parasite Detection, Isolation and Evaluation
- 2020-2022: OHEJP HARMONY-CAP One Health Harmonisation of Protocols for the Detection of Foodborne Pathogens and AMR Determinants
- 2018-2022: MeTVAC: MetVAC - Ecosmart Alternative Control Strategies against *T. annulata* and its Tick Vectors, Fundação para a Ciência e Tecnologia (FCT)



INTERVENTION AREAS

TRAINING, KNOWLEDGE AND TECHNOLOGY TRANSFER



TRAINING

- Detection of *Trichinella* larvae in meat by artificial digestion method (ISO 18743:2015)- 2 trainees INIAV, 2 trainees Regional Laboratory Madeira)

PhD Thesis

- Anthelmintic resistance in gastrointestinal nematodes of sheep (starting)

Master Theses

- Prevalence and risk factors for *Neospora caninum* in cattle in the Madeira Island, Msc Veterinary Medicine, FMV-ULisboa (in progress)
- Prevalence of zoonotic gastrointestinal parasites in dogs and cats in the Lisbon Metropolitan Area, Msc Medical Parasitology, IHMT (in progress)
- Detecção molecular de agentes transmitidos por ixodídeos em bovinos da raça Mertolenga em Portugal e mutações do gene cytb de *Theileria annulata* associadas a resistência a buparvaquona, Msc Biomedical Sciences, IHMT
- Molecular detection of *Anaplasma phagocytophilum* in sheep from the Alentejo region, Msc Veterinary Medicine, FMV-Ulusóфона (in progress)
- Prevalence and risk factors for *Toxoplasma gondii* in black and white Merino sheep in the Alentejo region, Msc Veterinary Medicine, FMV-ULisboa
- Risk factors for the prevalence of gastrointestinal and bronchopulmonary parasites in merino white and merino black sheep in the Alentejo, Msc Veterinary Medicine, FMV-ULisboa
- Epidemiological study of *fasciolosis* in merino black and merino white sheep, Msc Veterinary Medicine, FMV UÉvora
- Study of internal parasites in merino black and merino white sheep , Msc Veterinary Medicine FMV-Ulusóфона



THE PARASITOLOGY TEAM

**PARASITOLOGY
LABORATORY (2004-2021)**
Jacinto Gomes

MSc/BSc Students

Ana Paula Dutra
Pedro Vieira
Catarina Oliveira
Inês Sarraguça
Francisca Almeida
Delma Panda
Luísa Pinheiro
Joana Valério
David Dantas
Martim Fernandes
Tiago Pinto

PhD Students

Patrícia Lopes
Mariana Louro

Erasmus Student
Dimitra Mainou



OBRIGADA!





National Health Institute Doctor Ricardo Jorge - INSA National Reference Laboratory of Parasitic and Fungal Infections The last 3 years...

TASK FORCE COVID 19!!! OVERTIME!!!

Since March 2020 were performed at national level 44 756 804 COVID-19 laboratory tests. INSA tested 177300 samples (mainly from hospitals, nursing homes, schools and private and public companies screenings) AND coordinate a network of 173 laboratories (43 public hospitals, 34 from academia and 96 private sector).

NRL ACTIVITIES:

NUMBER OF ANALYSES PERFORMED

YEAR	2016	2017	2018	2019	2020	2021
HELMINTHS	877	966	2964	1202	1056	1077
PROTOZOA	2835	2292	2 558	2161	1 947	2124

MANDATORY NOTIFIABLE DISEASES Positive cases	2020	2021	2022
TRICHINELLA	0	0	0...
ECHINOCOCCOSIS	21	24	15...
TOXOPLASMOSIS	3	7	3...

PARTICIPATION IN QUALITY CONTROL PROGRAMS

UK NEQAS, QCMD and INSTAND

National Health Institute Doctor Ricardo Jorge - INSA National Reference Laboratory of Parasitic and Fungal Infections

The last 3 years...

PUBLISHED ARTICLES

Travel-associated human trichinellosis in Portugal DOI: [10.1016/j.idcr.2021.e01124](https://doi.org/10.1016/j.idcr.2021.e01124)

PCR Detection of *Toxoplasma gondii* in European Wild Rabbit (*Oryctolagus cuniculus*) from Portugal DOI: [10.3390/microorganisms8121926](https://doi.org/10.3390/microorganisms8121926)

First Report of *Echinococcus ortleppi* in Free-Living Wild Boar (*Sus scrofa*) from Portugal DOI: [10.3390/microorganisms9061256](https://doi.org/10.3390/microorganisms9061256)

Towards a rapid sequencing-based molecular surveillance and mosaicism investigation of *Toxoplasma gondii* DOI: [10.1007/s00436-019-06523-3](https://doi.org/10.1007/s00436-019-06523-3)

Occurrence of larval anisakids in horse mackerel (*Trachurus trachurus*) caught in Portuguese waters DOI: [10.1007/s00436-020-06816-y](https://doi.org/10.1007/s00436-020-06816-y)

Parallel Propagation of *Toxoplasma gondii* In Vivo, In Vitro and in Alternate Model: Towards Less Dependence on the Mice Model

doi.org/10.3390/pathogens11091038

Massive dissemination of a SARS-CoV-2 Spike Y839 variant in Portugal DOI: [10.1080/22221751.2020.1844552](https://doi.org/10.1080/22221751.2020.1844552)

SARS-CoV-2 introductions and early dynamics of the epidemic in Portugal DOI: [10.1038/s43856-022-00072-0](https://doi.org/10.1038/s43856-022-00072-0)

PRESENTATIONS IN SCIENTIFIC MEETINGS

Be aware of Strongyloides stercoralis hyperinfection: sepsis with fatal outcome. ECCMID, Amsterdam, Netherlands.

PARTICIPATION IN NATIONAL AND INTERNATIONAL RESEARCH PROJECTS

5 national projects with other research institutions and academia

MEME project (One Health EJP)

TOXOSOURCES project (One Health EJP)

TRAINING COURSES (ON LINE)

Human parasitic morphology and Malaria: laboratory diagnosis from A to Z

NATIONAL SURVEILLANCE NETWORK

Coordination of TORCH National Laboratorial surveillance network.

MEDICAL DOCTORS ROTATIONAL INTERNSHIP

3 medical doctors