



General Information	
Academic subject	<b>Agricultural acarology and nematology (Module of I.C. Agricultural acarology, nematology and weed management)</b>
Degree course	<b>Master course in Plant Medicine (LM69)</b>
ECTS credits	6
Compulsory attendance	No
Language	Italian

Subject teacher	Name Surname	Mail address	SSD
	Enrico de Lillo	<a href="mailto:enrico.delillo@uniba.it">enrico.delillo@uniba.it</a>	AGR/11

ECTS credits details	Area
Basic teaching activities	Plant protection disciplines

Class schedule	
Period	first semester
Year	first year
Type of class	Lectures, 4 ECTS (32 hours) Laboratory and field classroom and workshops, 2 ECTS (28 hours). E-learning public (eg Teams) and dedicated (Agripodcast) platforms can be used, on demand for students with disabilities, working students, student athletes and students with babies

Time management	
Hours	150
In-class study hours	60 (32 Lectures + 28 Laboratory)
Out-of-class study hours	90

Academic calendar	
Class begins	September 28, 2020
Class ends	January 22, 2021

Syllabus	
Prerequisites/requirements	General and applied biological and zoological knowledge
Expected learning outcomes (according to Dublin Descriptors and congruent with the learning outcomes contained in A4a, A4b, A4c tables of the SUA-CdS)	<p><i>Knowledge and understanding</i></p> <ul style="list-style-type: none"> <li>○ Knowledge and understanding of the morphological, bio-ethological and ecological aspects concerning phytophagous nematodes and mites, and their natural enemies</li> <li>○ Knowledge and understanding of the basic aspects of the integrated plant and product protection from phytophagous nematodes and mites, and the national and international related norms</li> </ul> <p><i>Applying knowledge and understanding</i></p> <ul style="list-style-type: none"> <li>○ Knowledge and understanding for the identification and characterization of phytophagous nematodes and mites, also based on the induced symptoms, and their natural enemies, by means conventional and advanced methods and techniques, included biotechnologies</li> <li>○ Knowledge and understanding for the application of direct and indirect (on the basis of the symptoms) monitoring plans of</li> </ul>



	<p>phytophagous nematodes and mites</p> <ul style="list-style-type: none"> <li>○ Knowledge and understanding for planning and managing the IPM of the crops and their products from phytophagous nematodes and mites in order to improve the qualitative, quantitative and sanitary aspects of the products as well as their storing and marketing</li> </ul> <p><i>Making informed judgements and choices</i></p> <ul style="list-style-type: none"> <li>○ Ability of understanding biological, ethological and ecological phenomena which allow the success of these plant feeders</li> <li>○ Ability of application of treatments able to limit the development of phytophagous nematodes and mites in the considered context</li> </ul> <p><i>Communicating knowledge and understanding</i></p> <ul style="list-style-type: none"> <li>○ Ability of spreading knowledge on phytophagous nematodes and mites, their natural enemies, and the biological, ethological and ecological phenomena of these plant feeders in the considered context</li> </ul> <p><i>Capacities to continue learning</i></p> <ul style="list-style-type: none"> <li>○ Ability of updating the own knowledge on phytophagous nematodes and mites, their natural enemies, and the biological, ethological and ecological phenomena involving these plant feeders in the considered context</li> </ul> <p>The results of the expected learning outcomes, in term of knowledge and ability, are listed in the Annex A of the Didactic Regulation of the Master Science Course in Plant Medicine (expressed by the European descriptors of the study title).</p>
<p>Contents</p>	<p>General nematology with particular regard to the plant feeders: morphology and anatomy, dimorphism; biology and behaviour, life history and reproductive strategies, biological strains, resistance stages, dispersion; population dynamics; effects of the abiotic and biotic factors; interactions between nematodes and their host plants; symptoms and injuries (morphological, biochemical and physiological alterations induced by nematodes on their host plants); relationships between plant nematodes and plant pathogens; defence mechanisms of plants against nematodes; agronomic, physical, natural, biological and chemical control and its problems.</p> <p>Main plant nematodes: <i>Meloidogyne incognita</i>, <i>M. javanica</i>, <i>M. arenaria</i>, <i>M. hapla</i>, <i>M. naasi</i>, <i>Globodera rostochiensis</i>, <i>G. pallida</i>, <i>Heterodera schachtii</i>, <i>H. avenae</i>, <i>H. cacti</i>, <i>H. carotae</i>, <i>H. fici</i>, <i>H. goettingiana</i>, <i>Ditylenchus dipsaci</i>, <i>Aphelenchoides fragariae</i>, <i>A. ritzema-bosi</i>, <i>Paratylenchus dianthus</i>, <i>Pratylenchus</i> spp., <i>Tylenchulus semipenetrans</i>, nematodes transmitting viruses, <i>Xiphinema index</i>.</p> <p>General acarology: morphology and anatomy, dimorphism and polymorphism, biology and behaviour, life history and reproductive strategies, diapause and quiescence, dispersion, trophic habit; mutualistic symbiosis; infochemicals; population dynamics; influence of biotic and abiotic factors; interactions between mites and their host plants; symptoms and injuries (morphological, biochemical and physiological alterations induced by nematodes on their host plants); defence mechanisms of plants against mites; agronomic, physical, biological and chemical control and its problems.</p> <p>Main phytophagous mites with particular regard to the plant feeders: Laelapidae (<i>Hypoaspis aculeifer</i>), Phytoseiidae (<i>Phytoseiulus</i></p>



	<p><i>persimilis</i>, <i>Typhlodromus exhilaratus</i>), Cheyletidae, Pyemotidae (<i>Pyemotes tritici</i>, <i>P. ventricosus</i>), Siteroptidae (<i>Siteroptes</i> spp.), Pygmephoridae (<i>Pediculaster mesembrinae</i>), Tarsonemidae (<i>Steneotarsonemus pallidus</i>, <i>Polyphagotarsonemus latus</i>), Penthaleidae (<i>Penthaleus major</i>), Tenuipalpidae (<i>Brevipalpus lewisi</i>), Tetranychidae (<i>Eotetranychus carpini vitis</i>, <i>Tetranychus urticae</i>, <i>Panonychus ulmi</i>, <i>P. citri</i>), Eriophyoidea (<i>Phytoptus avellanae</i>, <i>Colomerus vitis</i>, <i>Calepitrimerus vitis</i>, <i>Aculops lycopersici</i>, <i>Aculus fockeui</i>), Acaridae (<i>Acarus siro</i>, <i>Tyrophagus putrescentiae</i>, <i>T. similis</i>, <i>Rhizoglyphus robini</i>).</p> <p>Literature search, on line keys; support material (book, journals, on line sources). Microscopy and tools. Monitoring and sampling procedures; nematode and mite extraction; storing methods. Nematode and mite preparation for microscopical studies. Identification of nematodes, mites and the related symptoms. Rearing of some species. Efficacy indexes.</p>
<p>Course program Bibliography</p>	<ul style="list-style-type: none"> <li>• Notes of the lectures</li> </ul> <p>Study schemes:</p> <ul style="list-style-type: none"> <li>• presentations and other didactic material provided during the lessons</li> </ul> <p>Additional readings:</p> <ul style="list-style-type: none"> <li>• AA.VV., 2014 - Nematologia Agraria generale e applicate. SIN</li> <li>• Baccetti B., Barbagallo S., Suss L., Tremblay E., 2000 - Manuale di Zoologia agraria. A. Delfino Ed., Roma.</li> <li>• Evans G.O., 1992 - Principles of Acarology. CAB International</li> <li>• Hoy M.A., 2011 - Agricultural Acarology: Introduction to Integrated Mite Management. CRC Press Inc, 430 pages</li> <li>• Krantz G.W., Walter D.E., 2009 - A Manual of Acarology. Texas Tech University Press</li> <li>• Laffi F., Ponti I., 1997 - Acari dannosi alle piante. Schede fitopatologiche. Inf. Agr. ed.</li> <li>• Pellizzari Scaltriti G., 2002 - Parassitologia animale dei vegetali. CLEUP Editore.</li> <li>• Perry R.N., Moens M., 2006 - Plant Nematology. CABI, Wallingford, UK</li> <li>• Tacconi R., Ambrogioni L., 1995 - Nematodi da quarantena. Lo Scarabeo ed.</li> <li>• Zhang Z.-Q., 2003 - Mites of greenhouses. Identification, biology and control. CABI Publishing, Wallingford, UK.</li> </ul>
<p>Notes</p>	<p>Students could get a copy of all presentations utilized for lectures, including also those eventually needed for the practical activities, downloading them through the repository at the ATutor digital platform on the website <a href="http://tempus-it.agrif.bg.ac.rs/login.php">http://tempus-it.agrif.bg.ac.rs/login.php</a>.</p> <p>There is not a text in Italian language which treats all topics of the present discipline. Information can be fragmented or too specialist on Italian and International Journals and books.</p> <p>Therefore, students are strongly invited to follow the lessons in order</p>



	to have simplified and updated information
Teaching methods	The subjects are provided with several examples and illustrations by means of Power Point presentations, movies, practical drills in the classroom and laboratory
Assessment methods (indicate at least the type written, oral, other)	<p>Only the students enrolled in the academic year during which this module is offered, can have an intermediary exam during the teaching period of module. The result of this intermediary exam remains valid for the whole academic year and concurs to the final evaluation of the student.</p> <p>The intermediary exam will be given on the subjects treated during the lessons and the practical activities as reported in the Didactic Regulation in Plant Medicine (art. 9) and syllabus (annex A) and which is correlated to the actual teaching period. A minimum of 4 questions will be proposed to the student; two of them will regard general aspects of acarology and nematology, two of them will regard topics treated in the special parts of nematology and acarology. The evaluation of the intermediary exam is expressed in thirtieths.</p> <p>At the end of the module teaching period, the students, who passed positively the intermediary exam, can give the final exam concerning on the subjects treated during the lessons and the practical activities since the intermediary exam, as reported in the Didactic Regulation in Plant Medicine (art. 9) and syllabus (annex A) and which is correlated to the actual teaching period.</p> <p>Students who did not pass or give the intermediary exam will be examined on the whole subjects treated during the lessons and the practical activities as reported in the Didactic Regulation in Plant Medicine (art. 9) and syllabus (annex A) and which is correlated to the actual teaching period.</p> <p>The intermediary and the final exams consist of an oral test. The evaluation of the student is based on criteria previously fixed such as reported in the Annex A of the Didactic Regulation in Plant Medicine. The exam for foreign students can be given in English according to the above reported modalities.</p>
Evaluation criteria (Explain for each expected learning outcome what a student has to know, or is able to do, and how many levels of achievement there are.	<ul style="list-style-type: none"> <li>• <i>Knowledge and comprehension ability</i> <ul style="list-style-type: none"> <li>○ Description of the basic morphological, biological, ecological and ethological characteristics of the phytophagous nematodes and mites, and their natural enemies</li> <li>○ Description and evaluation of the basic aspects of the integrated plant and product protection from phytophagous nematodes and mites, and the national and international related norms</li> </ul> </li> <li>• <i>Knowledge and applied comprehension ability</i> <ul style="list-style-type: none"> <li>○ identification phytophagous nematodes and mites, and their natural enemies, also on the basis of the symptoms</li> <li>○ planning the monitoring of phytophagous nematodes and mites</li> <li>○ planning an integrated protection strategy of crop and products from phytophagous nematodes and mites in order to improve the qualitative, quantitative and sanitary aspects of the products, as well as their storing and marketing</li> </ul> </li> <li>• <i>Autonomy of judgement</i> <ul style="list-style-type: none"> <li>○ formulation of potential treatments on the factors favoring the success of phytophagous nematodes and mites</li> </ul> </li> </ul>



UNIVERSITÀ  
DEGLI STUDI DI BARI  
ALDO MORO

DIPARTIMENTO DI  
SCIENZE DEL SUOLO, DELLA  
PIANTA E DEGLI ALIMENTI

LAUREA MAGISTRALE IN  
MEDICINA DELLE PIANTE  
INTERNATIONAL JOINT MASTER DEGREE IN  
PLANT MEDICINE



	<ul style="list-style-type: none"> <li>○ evaluation of the planning and corrective treatments able to limit the success of phytophagous nematodes and mites</li> <li>• <i>Communication skills</i> <ul style="list-style-type: none"> <li>○ exhaustive description and illustration, with appropriateness of terms, richness of examples and correlation of the basic aspects which favour the success of phytophagous nematodes and mites</li> <li>○ ability to organize the acquired knowledge in form of didactic presentation and to articulate it for didactic purposes</li> </ul> </li> <li>• <i>Learning ability</i> <ul style="list-style-type: none"> <li>○ adaptation of the basic cognitive tools acquired during the module in order to explain and solve numerous applied problems and diversified case of study</li> </ul> </li> </ul>
Further information	<p><b>Visiting hours</b> Wednesday, Thursday and Friday from 11.30 am to 1.30 pm, after a request of appointment by mail or phone. Tutoring could be also made through the most common web applications.</p>