Accademia Nazionale Italiana di Entomologia

UNIVERSITÀ DEGLI STUDI DI NAPOLI "FEDERICO II"
DIPARTIMENTO DI AGRARIA
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CNR IRSA

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Spring Course

Methods in DNA taxonomy: a special focus on insects

Description

In the last 10 years, the use of DNA sequences for the identification and delimitation of taxa, namely DNA taxonomy, has found more and more consensus and applications in various fields. Especially after the advent of DNA barcoding, which showed the potential of using short DNA sequences for species identification, DNA taxonomy has become routinely used in many fields where the quick identification of taxa is needed. Nowadays, DNA metabarcoding is the most widely used method for performing biodiversity surveys exploiting molecular information since it allows the identification of many taxa simultaneously without the intervention of morphological taxonomists, even starting from environmental DNA. On the other hand, the molecular delimitation of species is very useful for carrying out taxonomic revisions and in the description of new species, especially when combined with morphology. In particular, it allows the detection of cryptic species that the morphology-based approach cannot recognize. DNA taxonomy methods are particularly useful when applied to insects, where the large number of existing species and the strong expertise required for their identification and delimitation make the application of standard morphological approaches difficult. This course aims to provide the theoretical and practical basis for applying DNA taxonomy methods to insects.

Trainers

Matteo Montagna - Department of Agricultural Sciences (Lab E. Tremblay), University of Naples Federico II

Diego Fontaneto - Molecular Ecology Group, CNR Istituto di Ricerca sulle Acque

Giulia Magoga - Department of Agricultural Sciences (Lab E. Tremblay), University of Naples Federico II

Location and dates: The course will take place at the Department of Agricultural Sciences – University of Naples Federico II in the Reggia of Portici (Piazza Carlo di Borbone, 1 - 80055 - Portici) and will last three days, from 22 to 24 April 2024.

Course's language: English

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Course program

Monday, 22 April 2024

14:00-15:00 Icebreaker

15:00-16:30 DNA barcoding and DNA metabarcoding (Theory; Matteo Montagna and Giulia Magoga)

16:30-17:00 Break

17:30-19:00 Seminar (on-line) and open discussion. *Italian odonates in the Pandora's box: a comprehensive DNA barcoding inventory shows taxonomic warning at the Holarctic scale* - Andrea Galimberti, Ph.D (University of Milan Bicocca - IT)

Tuesday, 23 April 2024

09:00-10:30 Basics of DNA barcoding (Hands-on activities; Giulia Magoga)

10:30-11:00 Coffee break

11:00-12:00 Basics of DNA barcoding (Hands-on activities; Giulia Magoga)

12.00-13.00 Seminar (on-line) and open discussion. *Exploring Freshwater Biodiversity Assessment with DNA and eDNA metabarcoding* - Rosetta Blackman, Ph.D (Eawag: Swiss Federal Institute of Aquatic Science and Technology - CH)

13:00-14:30 Lunch time

14:30-16:30 General introduction, alignments and phylogenetic inferences from DNA sequence data (distance-based and Maximum Likelihood approaches) (Theory; Matteo Montagna)

16:30-17:00 Break

17:00-19:00 DNA sequences alignment and phylogenetic inference (distance-based and Maximum Likelihood approaches) (Hands-on activities; Matteo Montagna)

Wednesday, 24 April 2024

9:30-11:00 Molecular species delimitation (Theory; Diego Fontaneto)

11:00-11:30 Coffee break

11:30-13:00 Molecular species delimitation (Hands-on activities; Diego Fontaneto and Giulia Magoga)

13:00-14:30 Lunch time

14:30-15:30 Seminar (on-line). *Taxonomy on the fast track* - Axel Hausmann, Ph.D (SNSB Zoologische Staatssammlung München - DE)

15:30-17:30 Seminar (on-line) and open discussion. *DNA taxonomy: the road ahead* - Jean-François Flot, Ph.D (Université Libre de Bruxelles - BE)