1. PhD position 'Population genomics of natural enemies': Wageningen, Netherlands

A PhD candidate who will work on the population genomics of natural enemies within the EU-funded Marie Sklodowska-Curie Innovative Training Network BINGO (Breeding Invertebrates for Next Generation Biocontrol). Intraspecific genetic variation in arthropods is often studied in the context of evolution and ecology. Such knowledge can also be very usefully applied for selection of genotypes with optimal trait values to develop more effective biocontrol agents. Key for this approach is the presence of adequate genetic variation as it determines the potential of populations to adapt to breeding objectives. Therefore, fundamental knowledge on the genetic variation of natural enemies, both in the field and in commercial mass-cultures, is of prime importance to design sampling programs and mass-rearing protocols. In this project, we aim to investigate the genetic variation in natural, as well as in mass-culture populations of three economically important natural enemies with contrasting biology, the predatory mite *Amblyseius swirskii*, the predatory bug *Nesidiocoris tenuis* and the parasitoid wasp *Trichogramma brassicae*.

Particular focus will be on the comparison of the genomic diversity between field collected and commercially reared populations. Using next-generation sequencing data and analysis, we will generate whole-genome data for these three species. This will allow to detect the genomic regions that are under selection in both situations in order to adapt to environmental and laboratory conditions. The whole-genome data arising from this project will also be used in other BINGO projects to facilitate artificial breeding and monitoring of natural enemies. The BINGO-ITN is funded by the EU Horizon 2020 programme and involves 12 partners from academia, non-profit organizations and industry located in the Netherlands, Germany, France, Spain, Czech Republic, Austria, Switzerland, Greece and Portugal. BINGO's approach is multidisciplinary, encompassing a broad range of scientific disciplines, including the application of state-of-the-art population genomics. The programme combines integrated training workshops and internship opportunities across the network, with career opportunities in academia, public or the private sectors. You will work in close cooperation with other PhD students and researchers involved in related research projects of the BINGO-ITN project. For more information about the BINGO project and other PhD vacancies see www.bingo-itn.eu.

Description

We seek a bright, highly motivated, and enthusiastic person able to work both as part of a team and independently. The ideal candidate shall have a master degree in evolutionary biology or genetics, with good background in population genetics, bioinformatics, genomics and computational biology. Candidates from other programs such as ecology or bioinformatics, with a strong interest in evolution and genetics are also invited to apply. Experience with NGS technologies and genomic data analysis is a plus, but training will be provided. The language in the lab is English. A high standard of spoken and written English is required. Eligibility criteria:

Candidates must be, at the time of recruitment by the host organisation, in the first four years (full-time equivalent) of their research careers and have not yet been awarded a doctoral degree. This is measured from the date when they obtained the degree which would formally entitle them to embark on a doctorate. Eligible candidates may be of any nationality but must not, at the time of recruitment have resided or carried out their main activity (work, studies, etc) in the country of their host organisation for more than 12 months in the 3 last years immediately prior to the reference date. BINGO aims to ensure equal opportunities, i.e. no job applicant or employee will receive less favourable treatment on the grounds of race, colour, nationality, ethnic or national origins, gender or marital status. This policy will include disabled persons who have the necessary attributes for the research project they are interested in.

Benefits

The position is full-time (38 hours/week), initially for 1 year after which a go/no-go decision will be taken on extension with another three years. The gross salary in the first year is â Ź 2125,- per month rising to â Ź 2717,- in the fourth year for a full-time appointment. The salary will not be less than the amounts specified for early stage researchers in the MSCA Innovative Training Network grant rules.----------

2. PhD position 'Genome-based selection for the improvement of natural enemies in biocontrol': Wageningen, Netherlands

A PhD candidate who will work on the development of genome-based selection for the improvement of natural enemies in biocontrol within the EU-funded Marie Sklodowska-Curie Innovative Training Network BINGO (Breeding Invertebrates for Next Generation Biocontrol). Intraspecific genetic variation in arthropods is often studied in the context of evolution and ecology. Such knowledge, can also be very usefully applied for selection of genotypes with optimal trait values to develop more effective biocontrol agents. For complex life-history or behavioural traits that lack easily recordable morphological phenotypes (i.e. longevity, development time, fecundity), the selection process can be laborious. Knowledge of the genomic regions underlying the traits can facilitate the screening and selection process. Genome-based selection (GS) methods use information from genome-wide DNA-markers to efficiently select for such complex traits. While they have been shown to hold great potential for plant and animal breeding, GS methods have not yet been applied for the improvement of natural enemies. In this project, we will seek proof-of-principle for the use of genome-based selection for key life history and natural enemy traits in the model parasitoid *Nasonia vitripennis*. Genome-based selection techniques will be built that accommodate the haplodiploid nature of parasitoids and other natural enemies. We will generate protocols for insect natural enemies and apply these protocols for the genome-based selection of Nasonia lines for complex life-history traits. The BINGO-ITN is funded by the EU Horizon 2020 programme and involves 12 partners from academia, non-profit organizations and industry located in the Netherlands,

Germany, France, Spain, Czech Republic, Austria, Switzerland, Greece and Portugal. BINGO's approach is multidisciplinary, encompassing a broad range of scientific disciplines, including the application of state-of-the-art population genomics. The programme combines integrated training workshops and internship opportunities across the network, with career opportunities in academia, public or the private sectors. You will work in close cooperation with other PhD students and researchers involved in related research projects of the BINGO-ITN project. For more information about the BINGO project and other PhD vacancies see www.bingo-itn.eu
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Description

We seek a bright, highly motivated, and enthusiastic person able to work both as part of a team and independently. The ideal candidate shall have a master degree in evolutionary biology, quantitative genetics or animal breeding, with a good background in population genetics, bioinformatics, genomics or computational biology. Candidates from other programs, with a strong interest in quantitative genetics are also invited to apply. Experience with NGS technologies and genomic data analysis is a plus, but training will be provided. Insect experimental work will be part of the project. The language in the lab is English. A high standard of spoken and written English is required. Eligibility criteria: Candidates must be, at the time of recruitment by the host organisation, in the first four years (full-time equivalent) of their research careers and have not yet been awarded a doctoral degree. This is measured from the date when they obtained the degree which would formally entitle them to embark on a doctorate. Eligible candidates may be of any nationality but must not, at the time of recruitment have resided or carried out their main activity (work, studies, etc) in the country of their host organisation for more than 12 months in the 3 last years immediately prior to the reference date. BINGO aims to ensure equal opportunities, i.e. no job applicant or employee will receive less favourable treatment on the grounds of race, colour, nationality, ethnic or national origins, gender or marital status. This policy will include disabled persons who have the necessary attributes for the research project they are interested in.

Benefits

The position is full-time (38 hours/week), initially for 1 year after which a go/no-go decision will be taken on extension with another three years. The gross salary in the first year is â Ź 2125,- per month rising to â Ź 2717,- in the fourth year for a full-time appointment. The salary will not be less than the amounts specified for early stage researchers in the MSCA Innovative Training Network grant rules.