



ESF - Science Meeting - Final Report

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APPLICATION DATA

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SCIENCE MEETING

Reference Number : **1353**
Report submitted : **23/02/2007 09:57:31**

ESF ACTIVITY

Unit(s) : **LESC**
Activity Title : **Integrating population genetics and conservation biology: Merging theoretical, experimental and applied approaches**
Activity Acronym : **CONGEN**

PROJECT

Science Meeting : **Workshop**
Title of Science Meeting : **CONSERVATION GENETICS: UPDATING CONCEPTS AND METHODS**
Location : **Biology Department of Akdeniz University Antalya, Turkey**
Date of Science Meeting : **21/01/2007 - 23/01/2007**
Convenor Name : **Professor Battal Ciplak, Antalya, Turkey**

BUDGET

Total estimated Expenditure : **3400 €**
ESF Grant requested : **3400 €**
Co-sponsorship Income : **0 €**

BUDGET GRANTED

ESF Grant FUNDING : **3400 €**

ACTUAL EXPENDITURE

Travel : **270 €**
Accommodation : **665 €**
Meals (lunch and dinner) : **1050 €**
Local administrative costs * : **1000 €**
TOTAL EXPENDITURE : 2985 €

* includes: administrative and technical assistance, printing, photocopying, telephone, fax, email, etc. Additional support for schools may be considered

REPORT TO ESF FOR THE WORKSHOP

CONSERVATION GENETICS: UPDATING CONCEPTS AND METHODS

22–23 JANUARY 2007, ANTALYA, TURKEY

by Battal CIPLAK- Akdeniz University Antalya, Turkey

Abstract

Biology is considered to be the science of the millennium and progressive new data in the area produced new research and application fields. Conservation genetics is such a new study area developed by merging the approaches of evolution, population genetics, ecology, statistic and other related disciplines. Especially new and effective DNA analysing methods allowed to determine genetic basis of the adaptations and to describe spatio-temporal characteristics of the gene pools. By using sophisticated statistical methods it become possible to predict the past and future histories of the populations. Molecular data sets mainly focus on neutral genetic variations, which are informative to predict past history of the population, are being used to understand the other dynamics of gene pools (such as inbreeding and outbreeding depression) and effects of functional genes subjected to selection, thus, allowed to manipulate future of the populations under the study. Progressions in this respect provide opportunities of developing more effective scientific approaches and methods in conservation of the natural or captive, wild or domesticated population.

The scope of the ESF programme “Integrating population genetics and conservation biology: Merging theoretical, experimental and applied approaches” lunched by European Science Foundation (ESF) is to establish a European-wide network of scientist working on conservation genetics from different perspectives and levels such as experimental population genetics, theoretical and computational population genetics and practical conservation genetics of captive/natural and wild/domesticated populations. Turkey is a country contributing to the programme via TUBITAK and the aim of the workshop “Conservation genetics: updating concepts and methods” is to activate Turkish scientist working in the field and to integrate them to the European research area in this respect.

Workshop content

The workshop was a two-days meeting including eleven talks in addition to a short opening and a discussion sessions. Meeting began with welcome speeches by the convenor and the vice rector of Akdeniz University Prof. Dr. Mehmet Aktekin. Following the ceremony an introductory presentation on genetics in conservation

biology was presented by Kuke Bjilmsa. Bjilmsa focused in the role of genetics in defining the important parameters and characters of endangered population and the genetic processes that may effects the persistence of such population. Especially in the talk the role of genetic erosion was emphasised. Remaining talks were provided a wide range of perspective for conservation genetics and can be included in to three categories; environmental stress factors in relation to adaptive genetic variability, methods in conservation genetics and the miscellaneous those took conservation issue in account from a non specific perspective.

Genetic variability, adaptation and environmental stress factors: There were six presentation have this perspective. Juha Merila considered the polygenic quantitative traits related to functional characteristics. He reported that the information gained using quantitative genetic method is fundamentally different from that gained by the analysis of neutral marker genes and quantitative genetic analyses allow better inferences about adaptive potential of traits and population. The second talk (by Luc De Meester) concentrated to the importance of genetic in understanding ecological respond under the stress condition. It is mentioned that the environmental stress factors or selection pressures are dynamic, thus, considering micro-evolutionary responses to them is important to understanding the future of the population. The third talk (by Volker Loeschcke) suggested a model for the captive population to study the adaptation to genetic and environmental stresses and to measure the value of resistance to thermal stress.

The conservation genetics is newly developing area and this kind of researches are young in Turkey. The internal presenter Aykut Kence presented three case studies on the honeybees, the mouflon *Ovis gmelinii* and wild goat. It is mentioned that the last two populations are living a bottle-necking and needs urgent consideration or conservation. Also, Kence reported that Anatolian honeybee subspecies harbour a considerable amount of variation, though there is possibility gene flow between subspecies because of beekeepers.

Kjetil Hindar, provided a perspective to conservation genetics fort he cases of devoted gene flow to semi-isolated population. From long term observation and sampling, it is founded the Salmons of farmer origin suffer higher mortality and their lifetime success is reduced when compared to wild salmon. Importantly, it is calculated with simulation that with a fixed intrusion rate of 20% escaped farmed salmon suggest that substantial changes take place in wild salmon populations within ten salmon generations.

Methods in conservation genetics: There is a wide range of methods used in conservation genetics from sampling to molecular techniques or to statistical calculations. One of the main problems in conservation genetics is sampling the nocturnal or highly active animals. Josef Bryja provided a detailed view for the sampling methods and their effectiveness. He mentioned that obtaining DNA from remnants of animals (such as hairs, feathers, nails, faeces eat.) has disadvantages because of low DNA quantity or poor extract quality. However, there are advanced techniques recently allowing to obtain non-invasive DNA and to use in conservation genetics. Another talk (by Reinhard Bürger) may be considered in methodology was on a mathematical model to calculate the intraspecific competition in relation to divergence. Developed model suggests that speciation become more difficult for very strong competition, but, more likely under the intermediate strength of competition.

Miscellaneous (or presentations provided a historical perspective for conservation): Remaining three talks were related to conservation issue from a wider perspective. Isabelle Olivieri provided a historical-phylogenetic perspective to the dispersal ability of a plant lineage in relation to its bacteria symbionts and reported that bacterial geographical diversity distribution has a strong influence on the geographic distribution of plant species and their ability to colonize new areas. The second talk providing a historical perspective was on historical constraints in the evolution of adaptive plasticity by Miguel Tejedo. Presented meta-analyses and phylogenetic comparative analyses reveal that larval amphibians exhibit a pattern of homoplasy or convergence in developmental plasticity across clades under the risk of pond desiccation, thus the contingency of climate changes affecting pond hydroperiod seems to affect equally to different amphibian lineages. The last talk was by the organiser and had a biogeographic perspective emphasised the evolution of a lineage in an environmentally highly active geographic area. The striking aspect of the results presented is the incongruent evolutionary rate of two different phenotypes, namely morphology and communication signals.

Other activities: Out of the presentation sessions occasions were provided for the participants to discuss with experts invited. During the tour to a National Park (a conservation area) and the cocktail shared by all speakers and participants students find possibility of discussing their data at hand and get comments of the experienced researchers. These also gave opportunity of planning future studies on the conservation genetics.

Final messages from the workshop

During workshop period or after it, following main agreements were expressed by participants (presenters and audiences).

- Importance of population genetics data in conservation biology was highlighted and this provided a contemporary perspective for the future studies of conservation genetics, especially for the young researchers in Turkey. To improve this perspective further, it is necessary to arrange similar meetings under the frame of ESF or other organisations. Especially, the training courses (on molecular techniques and statistical methods) will be much more beneficial for the students and young researchers. Steering Committee needs to consider this demand and to promote future training courses for young researchers.
- Study quantitative genetic instead of neutral marker diversity in small populations or model organism since such data allows to combine environmental stress factor and selection and gives a better understanding for the adaptive potential of individuals or populations.
- Use variety of methods in conservation genetics since different data obtaining methods and statistical analyses give different results and since each has advantages and disadvantages. Improved non-invasive genetic methods provide opportunities studying rare organisms.
- Establish a regional website for the conservation genetics. Students participated to the meeting believe that conservation genetics is still a high level research area and requires collaboration with experienced researchers. All presenters agreed to advise the students for their future questions by personal e-mails or an e-mail group.
- Re-benefit from presentations. Each of the presentations provided a full review the topic presented, and all were more beneficial than an individual paper. Audiences suggested establishment a website including full PDF file (or a similar format) of the presentations. Except few including unpublished data, presenters agreed to give their PDF files of their presentation. Organiser will contact to Turkish Scientific and Technical Research Council for preparation of such a web-site and along with an e-mail group to facilitate future communications of the participants.

WORKSHOP
CONSERVATION GENETICS: UPDATING CONCEPTS AND METHODS
22-23 JANUARY 2007 ANTALYA, TURKEY
AKDENİZ UNIVERSITY, OLBIA HALL-A

Monday, January 22nd, 2007	
09:00-09:30	Opening Session

Session: Monday_A.M.		
09:30-10:10	Kuke BIJLSMA(The Netherlands)	Genetics in Conservation Biology
10:10-10:40	Coffee – Tea Break	
Session: Monday_A.M.		Moderator: Volker Loeschke
10:40-11:20	Juha MERILÄ (Finland)	Conservation of adaptive genetic variability in the wild -insights from comparative studies of marker gene and quantitative trait variation
11:20-12.00	Luc De MEESTER (Belgium)	The feedback of micro-evolution to ecology: the importance of genetics to understand ecological responses in a stressed world
12:00-13.30	Lunch Break	
Session: Monday – P.M.		Moderator: Kuke Bijlsma
13:30-14:10	Volker LOESCHCKE (Denmark)	Environmental stress and adaptation – using <i>Drosophila</i> as a model
14:10-14:50	Reinhard BURGER (Austria)	On the conditions for sympatric speciation through intraspecific competition
14:50-15:10	Coffee – Tea Break	
Session: Monday P.M.		Moderator: Juha Merilä
15:10-15:50	Isabelle OLIVIERI (France)	<i>Medicago</i> – <i>Sinorhizobium</i> symbiotic specificity evolution and the geographic expansion of <i>Medicago</i>
15:50-16:30	Josef BRYJA (Czech Republic)	Non-invasive genetic methods: advantages and disadvantages
18:00-20:00	Cocktail –Guest House	Workshop participants

Tuesday, January 23th, 2007

Session: Tuesday_A.M.		Moderator: Isabelle Olivieri
09:00-09:40	Kjetil HINDAR (Norway)	Elevated levels of gene flow as a threat to semi-isolated populations
09:40-10:20	Aykut KENCE (Turkey)	Case studies on conservation genetics in Turkey
10:20-10:40	Coffee – Tea Break	
		Moderator: Aykut Kence
10:40-11:20	Miguel TEJEDO (Spain)	Conservation of biodiversity and historical constraints in the evolution of adaptive plasticity
11:20-12:20	Battal CIPLAK (Turkey)	Phylogeography of <i>Eupholidoptera</i> (Orthoptera, Tettigoniidae): the highly variable paleogeography resulted into a relict fauna in the Mediterranean
11:20-12:40		Final Discussion
12:40-13:30	Lunch break	
13:00-17:30	In-workshop tour	Thermessos National Park

Tuesday, January 23th, 2007 (evening)/ Wednesday, 24th 2007 - Departure

List of the speakers

Kuke Bijlsma (Centre of Ecological and Evolutionary Studies, University of Groningen, Haren, Netherlands)

Volker Loeschcke (Department of Ecology and Genetics, Institute of Biological Sciences, University of Aarhus, Aarhus, Denmark)

Juha Merilä (Department of Population Biology, University of Helsinki, Finland)

Luc De Meester (Laboratory of Aquatic Ecology, Katholieke Universiteit Leuven, Leuven, Belgium)

Isabelle Olivieri (University of Montpellier, Montpellier, France)

Kjetil Hindar (Norwegian Institute of Nature Research, Trondheim, Norway)

Josef Bryja (Academy of Sciences of the Czech Republic, Institute of Vertebrate Biology, Brno, Czech Republic)

Reinhard Bürger (Institut für Mathematik, Universität Wien, Vienna, Austria)

Miguel Tejedo (Estación Biológica de Doñana-CSIC, Department of Evolutionary Biology, Sevilla, Spain)

Aykut Kence (Department of Biology, Middle East Technical University, Ankara, Turkey)

Battal Ciplak (Department of Biology, Faculty of Art&Science, Akdeniz University Antalya, Turkey)

PARTICIPANTS OF WORKSHOP

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5. Meral KENCE Middle East Technical University, Ankara, Turkey
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8. Serdal ARSLAN Cumhuriyet University, Sivas, Turkey
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