# "Beekeepers and Scientists hand by hand to Conserve Honeybees and Biodiversity. Examples from Jordan."


*Dr. Nizar Haddad*
*Director of the Bee Research Department,*
*National Center for Agriculture Research and Extension, Baqa – Jordan.*
*President of the Jordanian Beekeepers Union*
*www.jordanbru.info, www.jordanbeekeeper.org*
*drnizarh@gmail.com*

# Talk Plan

1. *Apis mellifera syriaca* conservation in Jordan.
2. Beekeepers Union Efforts
3. Examples of Cross Boarder Researches

# *Apis mellifera syriaca*

- ***Apis mellifera syriaca*** (Jordan, and most of the Levant):

- Nervous bee.
- Low honey production
- Swarming

BEE RESEARCH UNIT
NCARE - JORDAN

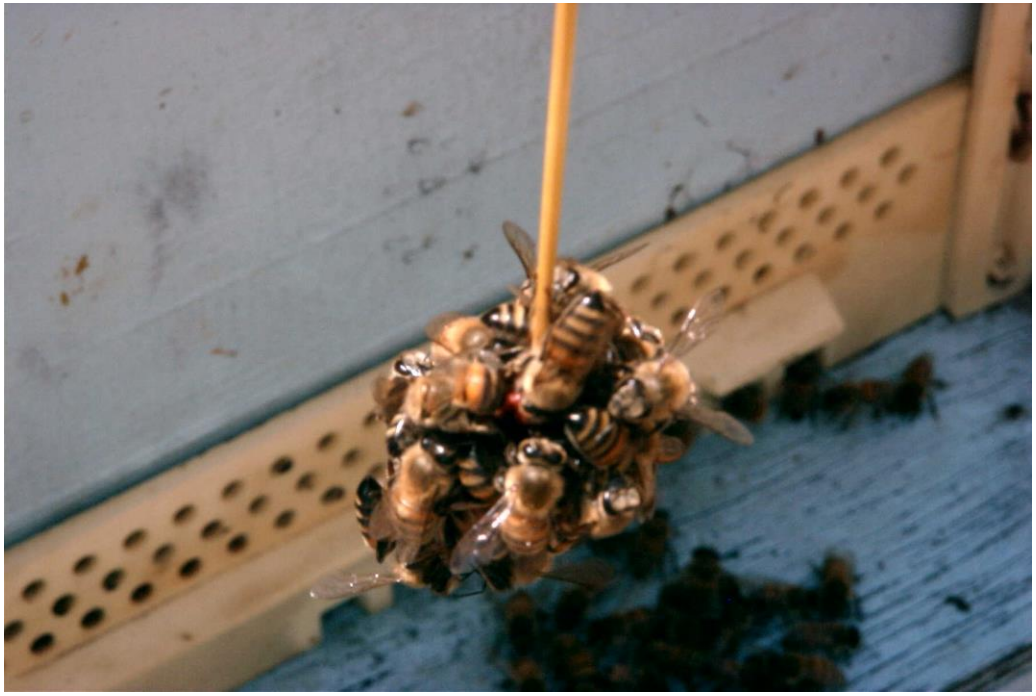
# Why we are working on the conservation of the *Apis mellifera syriaca*?

BEE RESEARCH UNIT
NCARE - JORDAN

# Harsh climatic conditions

BEE RESEARCH UNIT
NCARE - JORDAN

# *Defensive against predators*



**-Haddad** N. Fuchs S., Batainha A., 2006. Decrease of flight activity by *Vespa orientalis* at the fligh entrance of *Apis mellifera syriaca* in Jordan. Proceedings of The Second European Conference of Apidology 2006.p77. **Czech Republic**

–**Haddad.N.J,** Fuchs S. March **2005**. Presence of *Vespa orientalis* at the flight entrance of *Apis mellifera syriaca* in Jordan decreases flight activity. 53. Jahrestagung der Arbeitsgemeinschaft der Institute für Bienenforschung. **Germany**.

BEE RESEARCH UNIT
NCARE - JORDAN

# *Varroa haplotype*

Advances in Environmental Biology, 1(1): 1-3, 2007
ISSN 1995-0756


This is a refereed journal and all articles are professionally screened and reviewed

ORIGINAL ARTICLE

## Genetic Structure of *Varroa* Mite Populations in *A. Mellifera syriaca*

[1]Nizar Haddad N, Hussein Migdadi, [2]Jay Evans J, Jeff Pettis J

# Hygienic behavior

BEE RESEARCH UNIT
NCARE - JORDAN

*"Apis m.syriaca* had the strongest hygienic behavior and the lowest *Varroa* infestation levels in comparisons with *Apis m. anatoliaca, Apis m. carnica,* and *Apis m. caucasica"*

**Entomologia Experimentalis et Applicata**

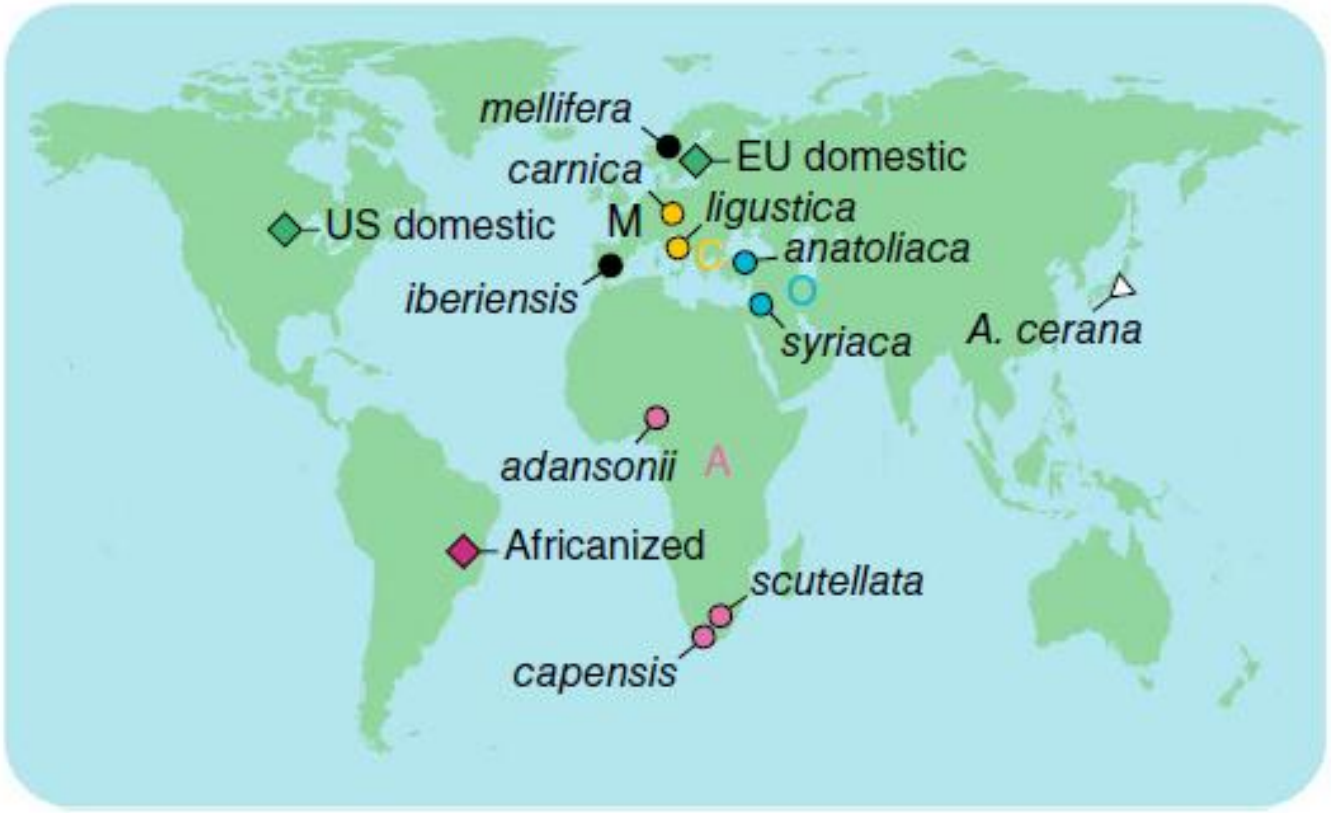
DOI: 10.1111/eea.12109

## Honey bee colonies from different races show variation in defenses against the varroa mite in a 'common garden'

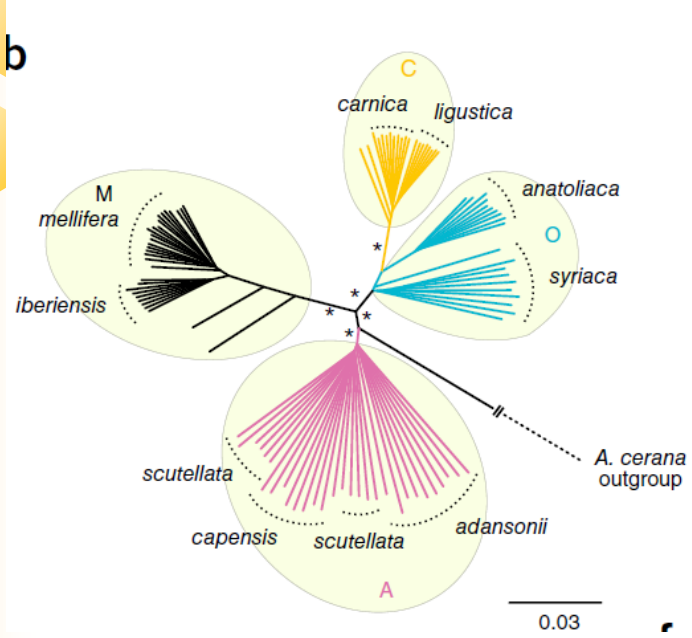
Meral Kence[1], Devrim Oskay[2], Tugrul Giray[3]* & Aykut Kence[1]

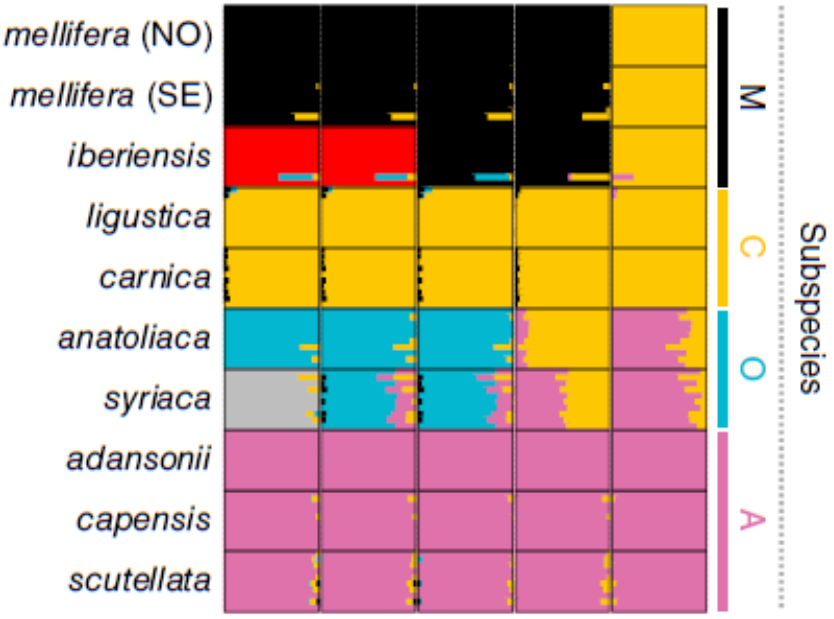
BEE RESEARCH UNIT NCARE - JORDAN

Andreas Wallberg, Fan Han, Gustaf Wellhagen, Bjørn Dahle, Masakado Kawata, **Nizar Haddad**, Zilá Luz Paulino Simões, Mike H Allsopp, Irfan Kandemir, Pilar De la Rúa, Christian W Pirk, Matthew T Webster. 2014. ***A worldwide survey of genome sequence variation provides insight into the evolutionary history of the honeybee Apis mellifera***. Nature Genetics. doi:10.1038/ng.3077.



# Evaluation of *Apis m syriaca* among other bee lineages

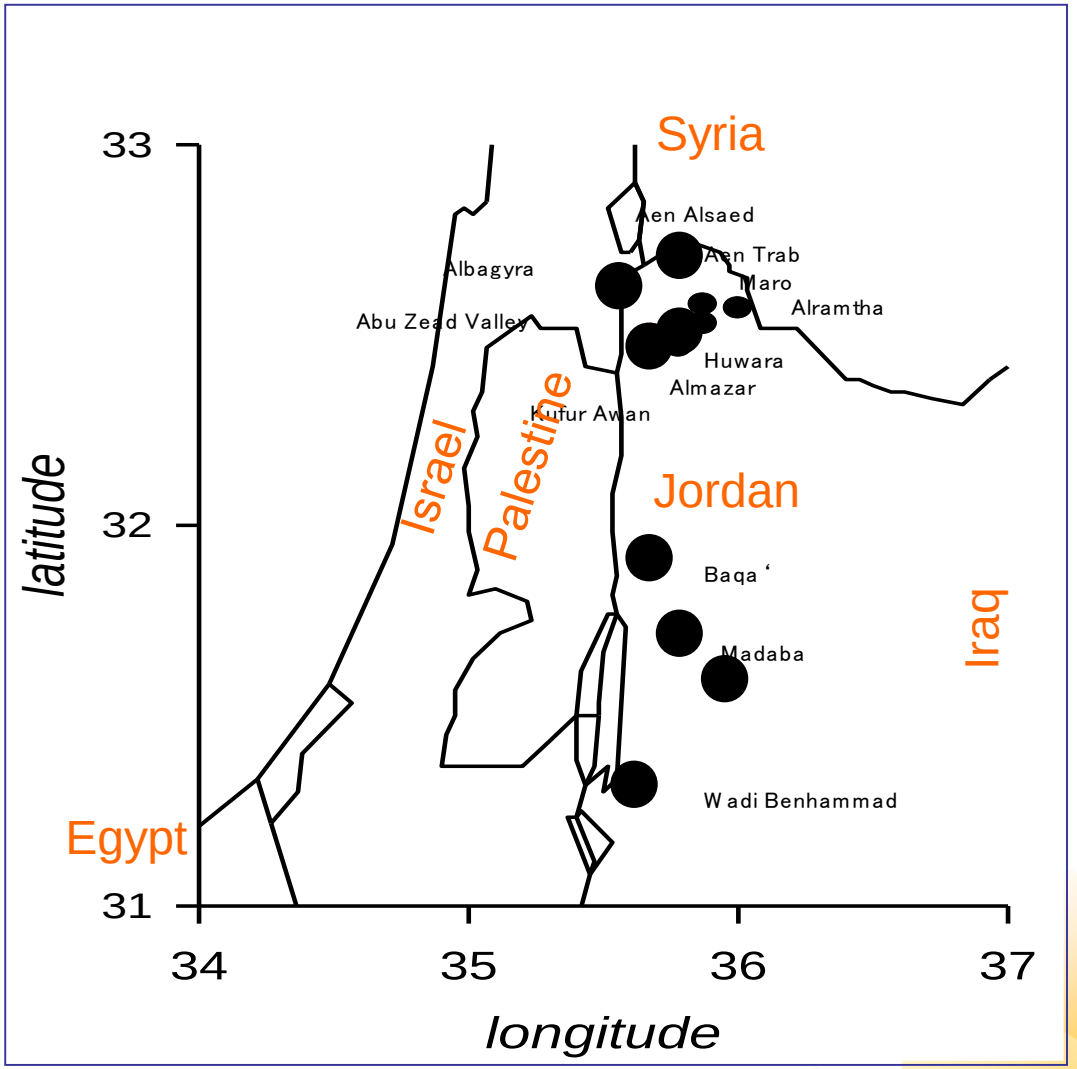


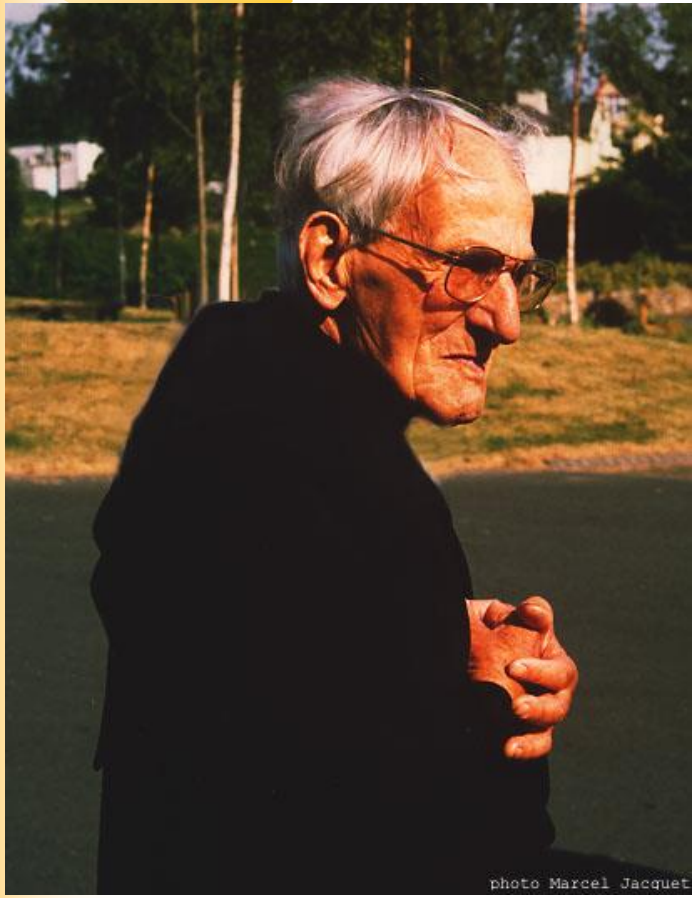

Wallberg et al., (2014) Found that *A. m.syriaca* bee has a gene flow between honey bees from Africa and Asia, estimated to be about 18%.

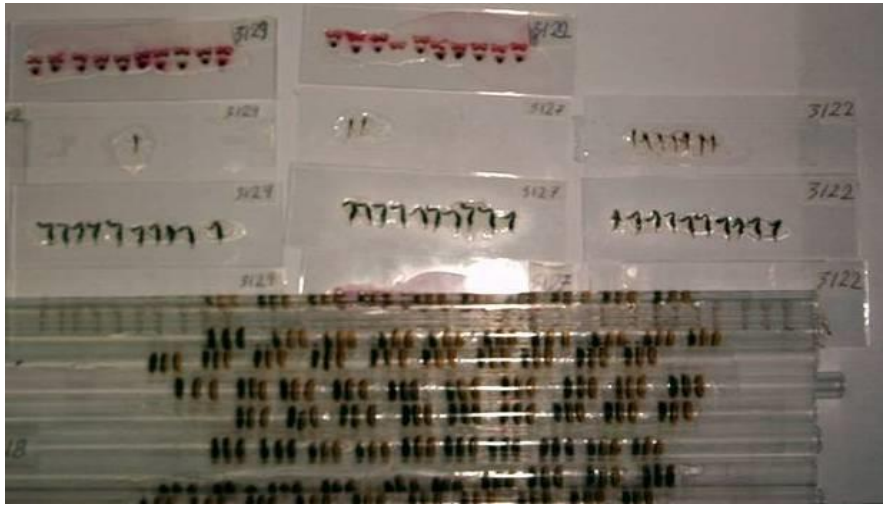
BEE RESEARCH UNIT
NCARE - JORDAN

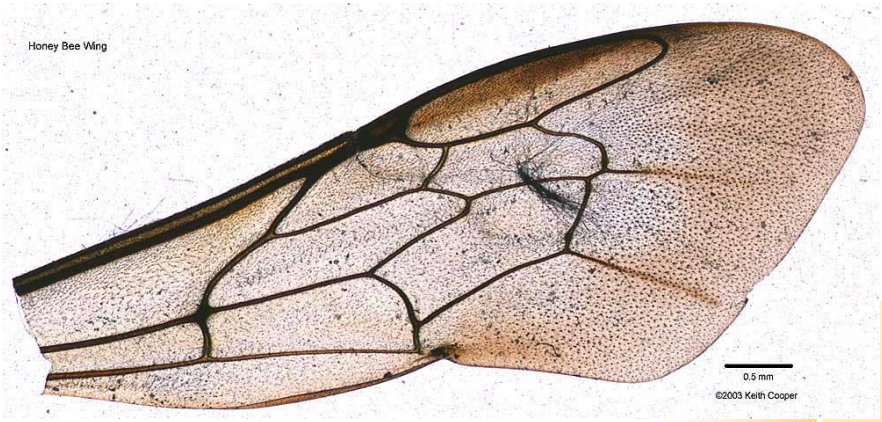
# Sampling – 2002



# Morphometric Analyses

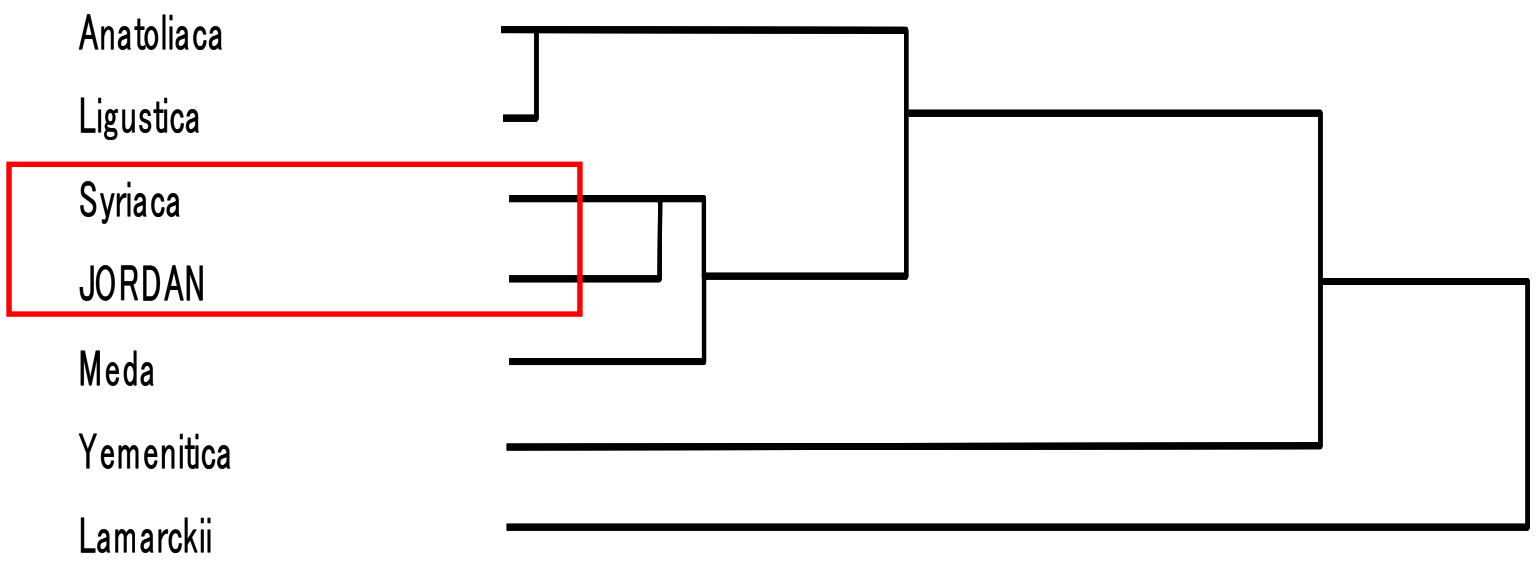





BEE RESEARCH UNIT
NCARE - JORDAN

Hierarchical clustering based on group centroid positions of colony means in factor analysis



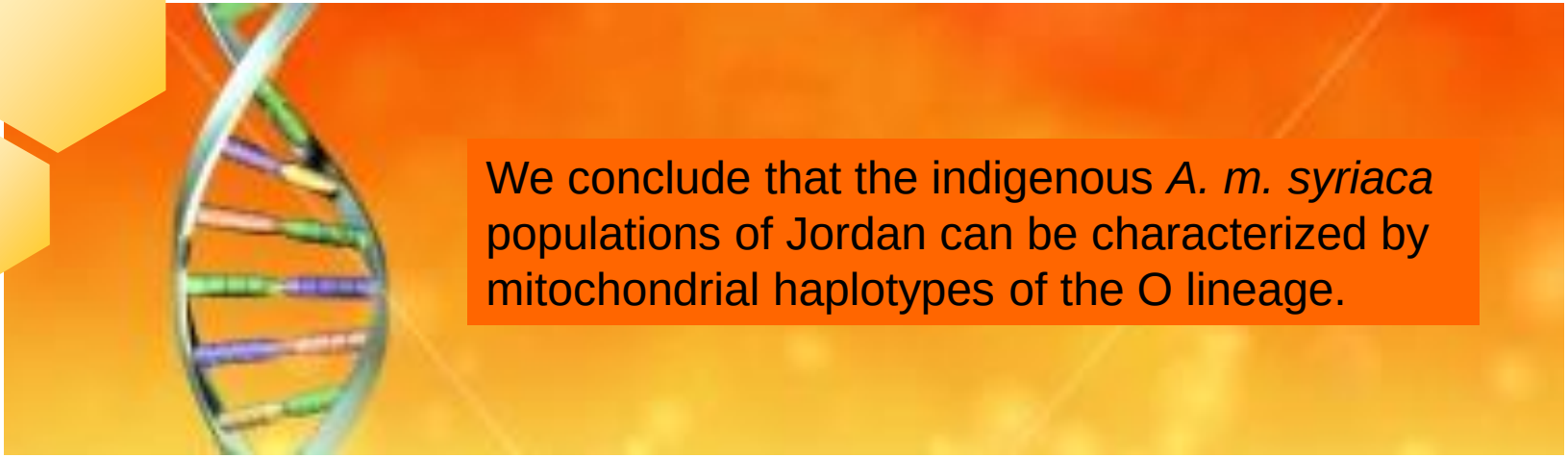

**ARIŞTIRMA-Araştırma Research-APICULTURAL RESEARCH**

# HONEYBEE AGROBIODIVERSITY: A PROJECT IN CONSERVATION OF *APIS MELLIFERA SYRIACA* IN JORDAN

**Balarısı Tarımsal-Biyoçeşitliliği: Ürdün'de *Apis mellifera syriaca* Arısının Korunması Projesi**

N. HADDAD[1], S. FUCHS[2]

# Mitochondrial DNA variation



We conclude that the indigenous *A. m. syriaca* populations of Jordan can be characterized by mitochondrial haplotypes of the O lineage.

*Journal of Apicultural Research and Bee World* 48(1): 19-22 (2009)
DOI 10.3896/IBRA.1.48.1.05



ORIGINAL RESEARCH ARTICLE

## Mitochondrial DNA support for genetic reserves of *Apis mellifera syriaca* in Jordan.

**Nizar Haddad[1], Marina D. Meixner[2,5*], Stefan Fuchs[4], Hussein Migdadi[1], Lionel Garnery[4], Walter S. Sheppard[2].**

# Conservation program 2003

Conservation apiaries

BEE RESEARCH UNIT
NCARE - JORDAN

# Methods of conservation

1- Artificial insemination

2- Mating in non-isolated area

3- Mating in an isolated area

BEE RESEARCH UNIT
NCARE - JORDAN

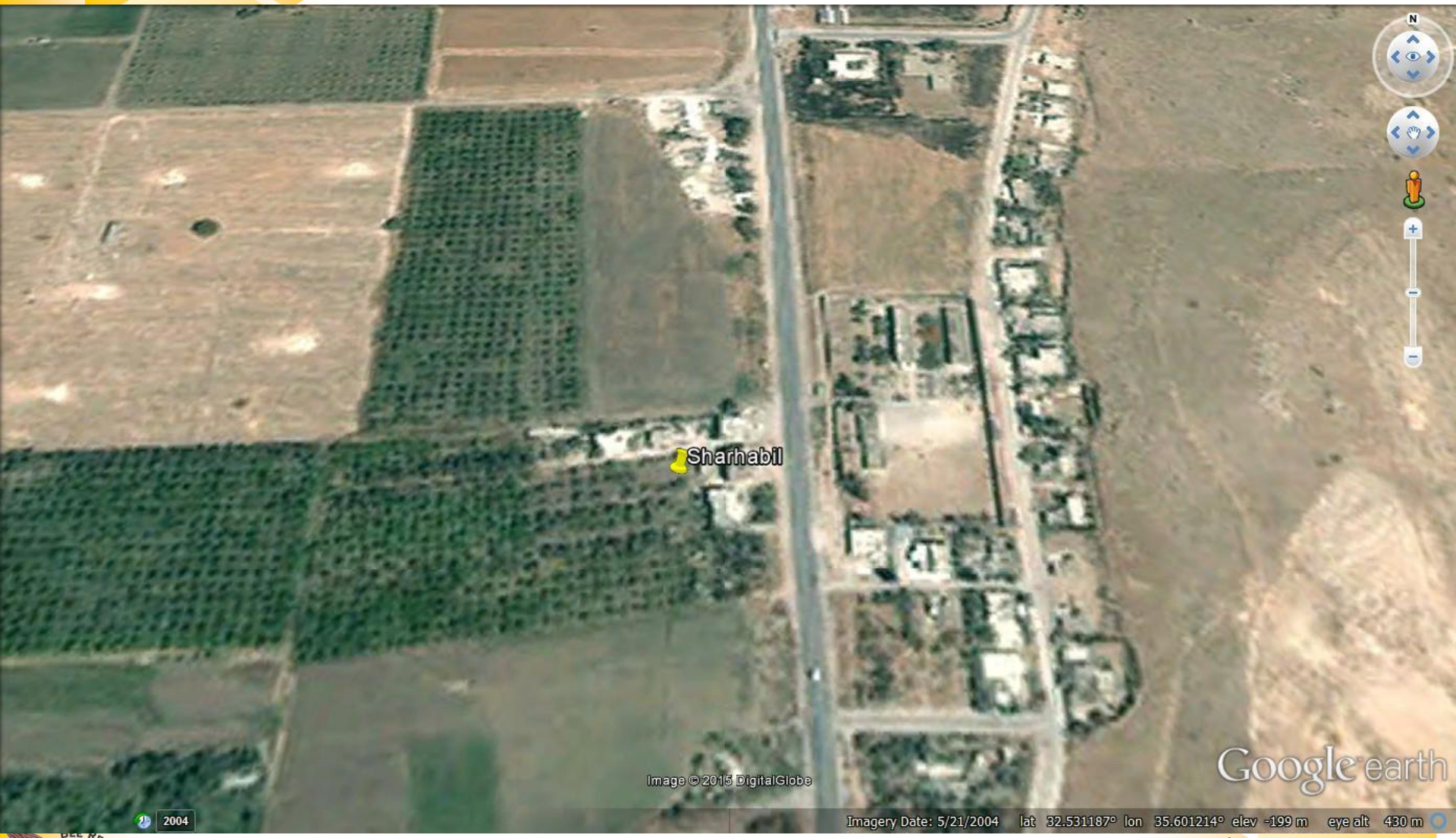
# Conservation apiaries / Maru


BEE RESEARCH UNIT
NCARE - JORDAN

# Conservation apiaries / Khanasri


BEE RESEARCH UNIT
NCARE - JORDAN

# Conservation apiaries / Jordan Valley



# Queen Rearing program / Beekeepers participatory approach

BEE RESEARCH UNIT
NCARE - JORDAN

# *Apis m. Syriaca* genetic material

Mitochondria DNA

http://informahealthcare.com/mdn
ISSN: 1940-1736 (print), 1940-1744 (electronic)

Mitochondrial DNA, Early Online: 1–2
 DOI: 10.3109/19401736.2014.1003846

informa healthcare

MITOGENOME ANNOUNCEMENT

## Mitochondrial genome of the Levant Region honeybee, *Apis mellifera syriaca* (Hymenoptera: Apidae)

BEE RESEARCH UNIT NCARE - JORDAN

Insect science

*Insect Science* (2015) 00, 1–12, DOI 10.1111/1744-7917.12205

ORIGINAL ARTICLE

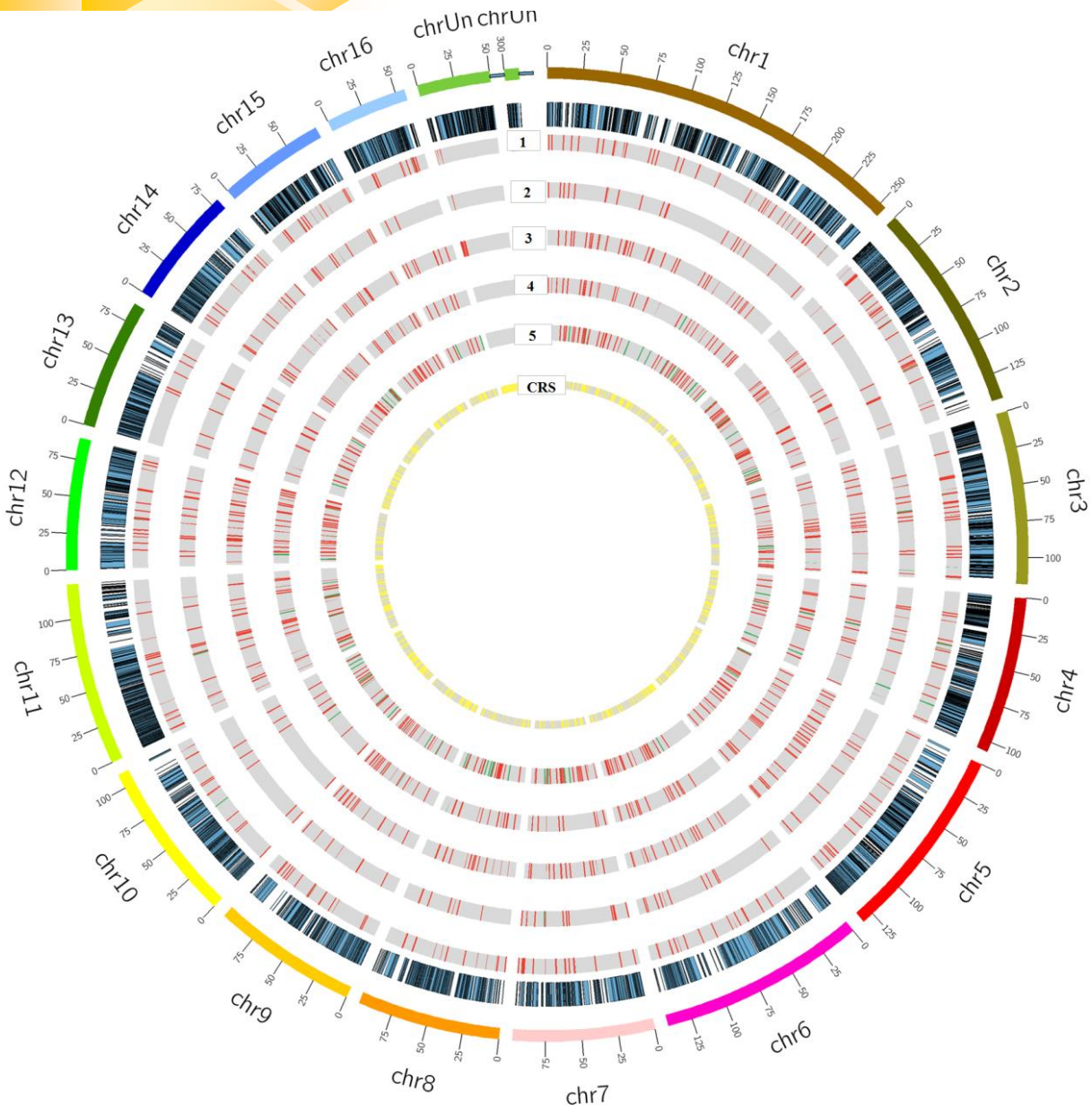
# Next generation sequencing of *Apis mellifera syriaca* identifies genes for *Varroa* resistance and beneficial bee keeping traits

Nizar Haddad[1], Ahmed Mahmud Batainh[1], Osama Suleiman Migdadi[2], Deepti Saini[3], Venkatesh Krishnamurthy[3], Sriram Parameswaran[3] and Zaid Alhamuri[2]

*Varroa hygiene*
*Varroa* resistance
Immune related embryonic development
Functional variations genes between *A. mellifera and A. m. syriaca*

BEE RESEARCH UNIT
NCARE - JORDAN

# Comparative Genome Hybridization




**1-** Instrumental insemination

**2 +3 -** Un-isolated Maru research apiary where (1200 - 2000) queen bees

**4+5** - Isolated areas

**CRS** – Reference Sample 2002.

# Percentage of variable probes in *A. m. syriaca* bees compared to the CRS.

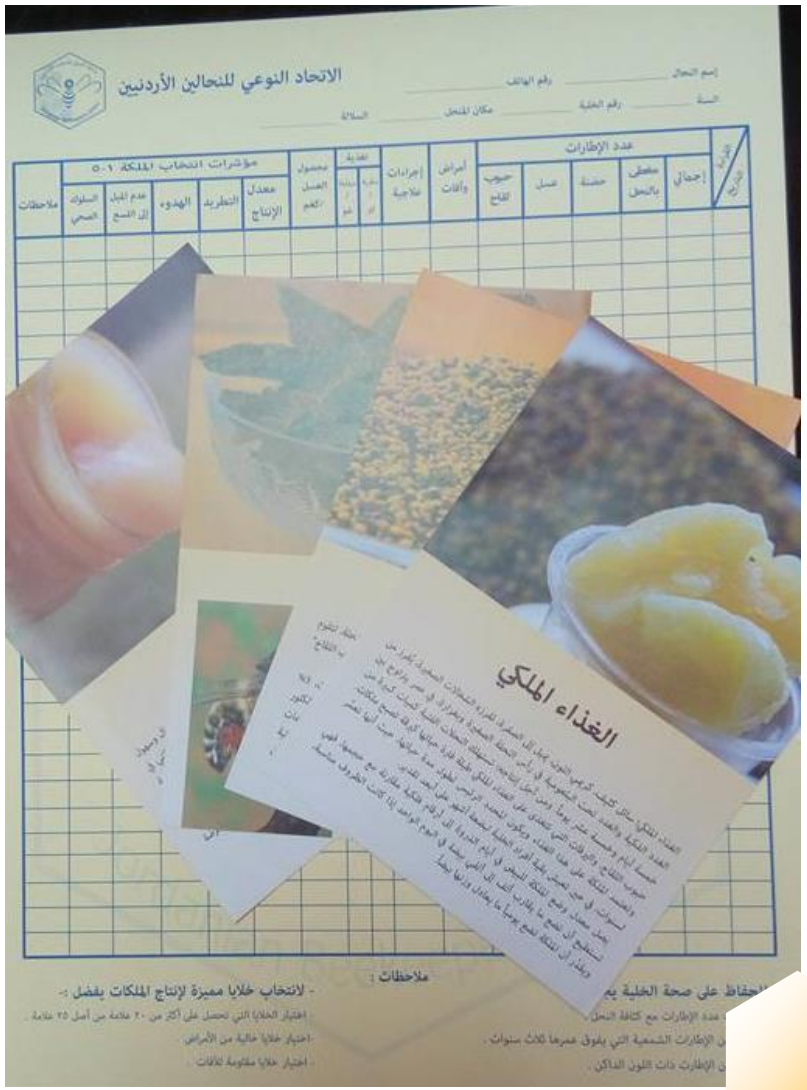
| Samples | Amplification | Deletion | Total | % |
|---|---|---|---|---|
| 1 | 4187 | 240 | 4427 | 1.06 |
| 2 | 854 | 296 | 1150 | 0.28 |
| 3 | 1468 | 6 | 1474 | 0.35 |
| 4 | 1748 | 447 | 2195 | 0.53 |
| 5 | 3800 | 1579 | 5379 | 1.29 |
| **Common** | 5594 | 1340 | 6934 | 1.66 |

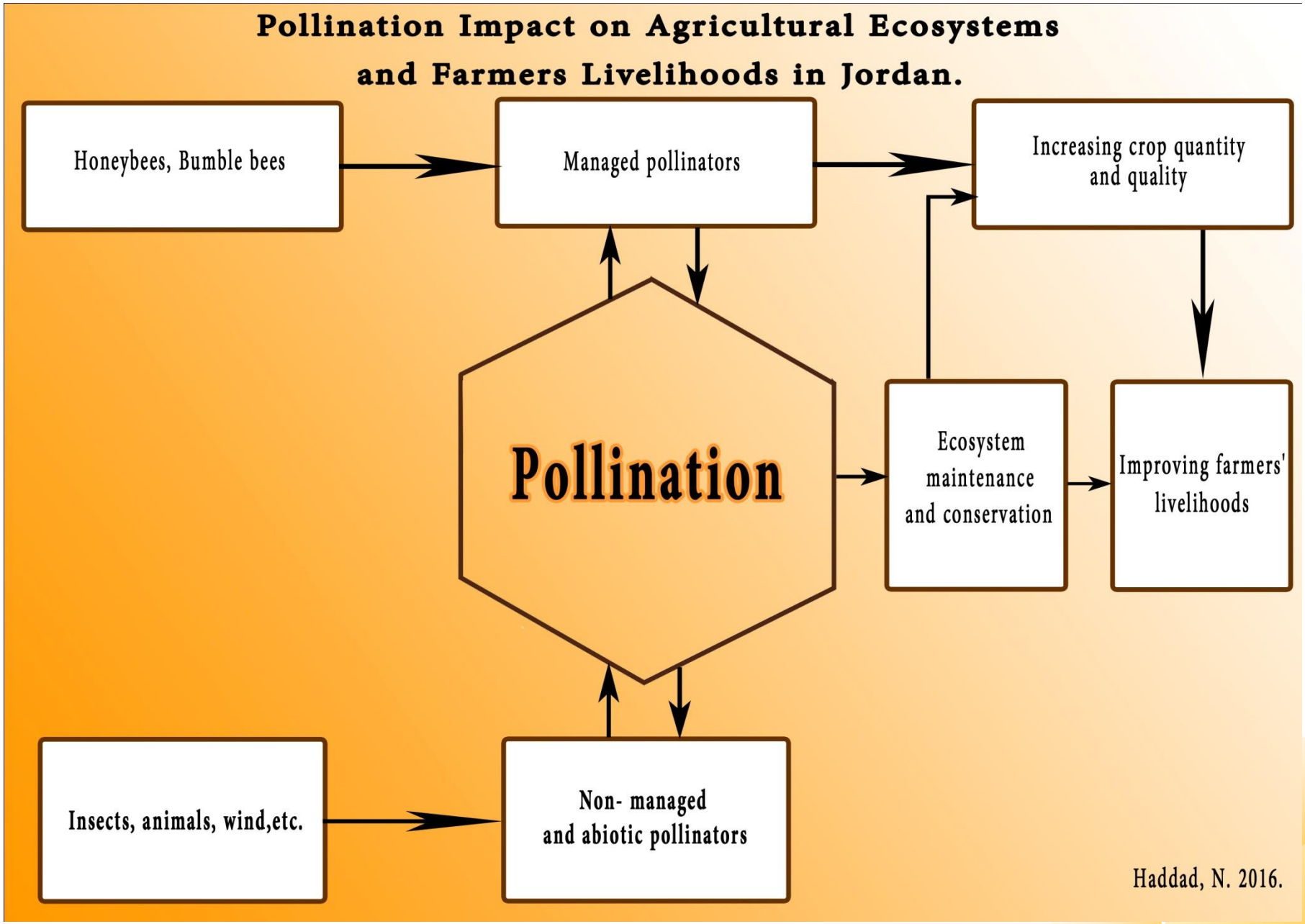
BEE RESEARCH UNIT
NCARE - JORDAN

# Beekeepers Union Efforts

# Planting of native and imported bee forest plants

# Related Society’s Awareness in Jordan




Pollination Impact on Agricultural Ecosystems and Farmers Livelihoods in Jordan.
Honeybees, Bumble bees
Managed pollinators
Increasing crop quantity and quality
Pollination
Ecosystem maintenance and conservation
Improving farmers' livelihoods
Insects, animals, wind,etc.
Non- managed and abiotic pollinators
Haddad, N. 2016.

# Training workshops

# Related Society’s Awareness in Jordan

Over 20,000 students where approached during the last 3 years

# يعلن الاتحاد النوعي للنحالين الاردنيين

## عن تنظيم جائزته الثانية بعنوان:

## النحل والنظام البيئي
## 2016

وتشمل الجائزة الفئات التالية:
- التصوير الفوتوغرافي
- النص الصحفي/ الادبي
- الفلم



للاطلاع على شروط المسابقة
يرجى زيارة الموقع

**www.jordanbeekeeper.org | www.jordanbeekeeper.info**

Jordanian Beekeepers Union

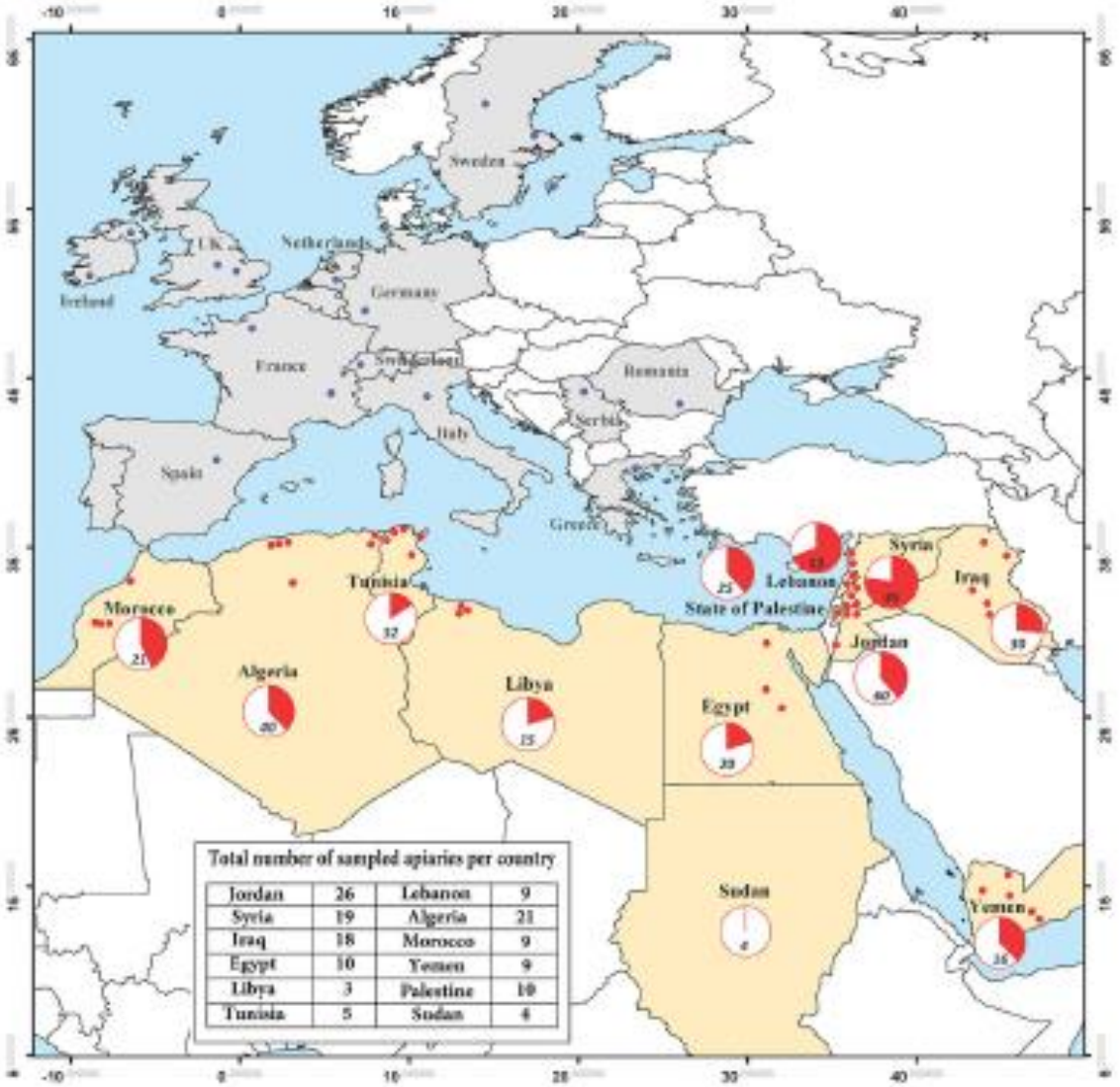
وزارة البيئة

Implemented by:
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

التعاون الألماني
DEUTSCHE ZUSAMMENARBEIT


INTERNET
HOBOS
IMPORTANCE
EDUCATION
LEARNING
BIONICS
MULTIMEDIAL
EDUCATION
ECOLOGICAL
ELEARNING
BEEHIVE
STUDENTS
INSIGHT
IMPORTANCE
LEARNING
REALTIME
HONEYBEE
BEEHIVE
LEARNING
INQUIRY
EMOTION
LESSON
FUN
INQUIRY
LESSON
MOTIVATION
FUN
FUN
MEASUREMENT
MODULS
INTERNET
CCD
CCD
HONEYBEE
LESSON
LESSON
LIVE
MODULS
LIVE
ECONOMIC
ECONOMIC
INTERNET
LIVE
ORIGINAL
GREEN
HOBOS
MODULS
HOBOS
EMOTION
BIONICS
LIVE
MOTIVATION
BEEMORTALITY
BEEMORTALITY
SUSTAINABILITY
FUN
GREEN
STUDENTS
STUDENTS
INTERACTIVE
PLATFORM
INQUIRY
INTERNET
TEACHER
ECOLOGICAL MEASUREMENT
EDUCATION
KNOWLEDGE
EDUCATION
CLASSROOM
BEEHIVE
BIONICS
OBSERVING
STATIONS
SUSTAINABILITY
PORTAL
ANIMALS
MEASUREMENT
OBSERVING
MULTIMEDIAL
INQUIRY
REALTIME
PORTAL
BEEHIVE
GREEN
CCD
BEE
BEE
BEEHIVE
CLASSROOM
INSIGHT
SUSTAINABILITY
BEEMORTALITY
INSIGHT
PORTAL
ECONOMIC
ECONOMIC
PORTAL
REALTIME
ORIGINAL
CCD
LEARNING
CCD
GREEN
HOBOS
ELEARNING
TEACHER
LIVE
MULTIMEDIAL
HONEYBEE
SCIENCE
HONEYBEE
STUDENTS
KNOWLEDGE
ECONOMIC
EMOTION
PLATFORM
REALTIME
EDUCATION
SUSTAINABILITY
INTERACTIVE
BEEMORTALITY
TEACHER
MOTIVATION
ECOLOGICAL
PORTAL
SCIENCE
BIONICS
STUDENTS
LEARNING
EMOTION
FUN
HOBOS
BEEHIVE
EMOTION
ORIGINAL
SCIENCE
INSIGHT
TEACHER
STUDENTS
INTERACTIVE
INSIGHT
ANIMALS
SUSTAINABILITY
CLASSROOM
MEASUREMENT
ORIGINAL
HONEYBEE
STATIONS
BEE
LESSON
KNOWLEDGE
BEE
CLASSROOM
SCIENCE
PLATFORM
ANIMALS
CLASSROOM
PLATFORM
GREEN
ORIGINAL
INTERACTIVE
STATIONS
KNOWLEDGE
REALTIME
KNOWLEDGE
ELEARNING
ANIMALS
BIONICS
MODULS
OBSERVING
INQUIRY
ECOLOGICAL
SCIENCE
ORIGINAL
TEACHER
PLATFORM
STATIONS

# Examples of Cross Boarder Researches




BEE RESEARCH UNIT
NCARE - JORDAN

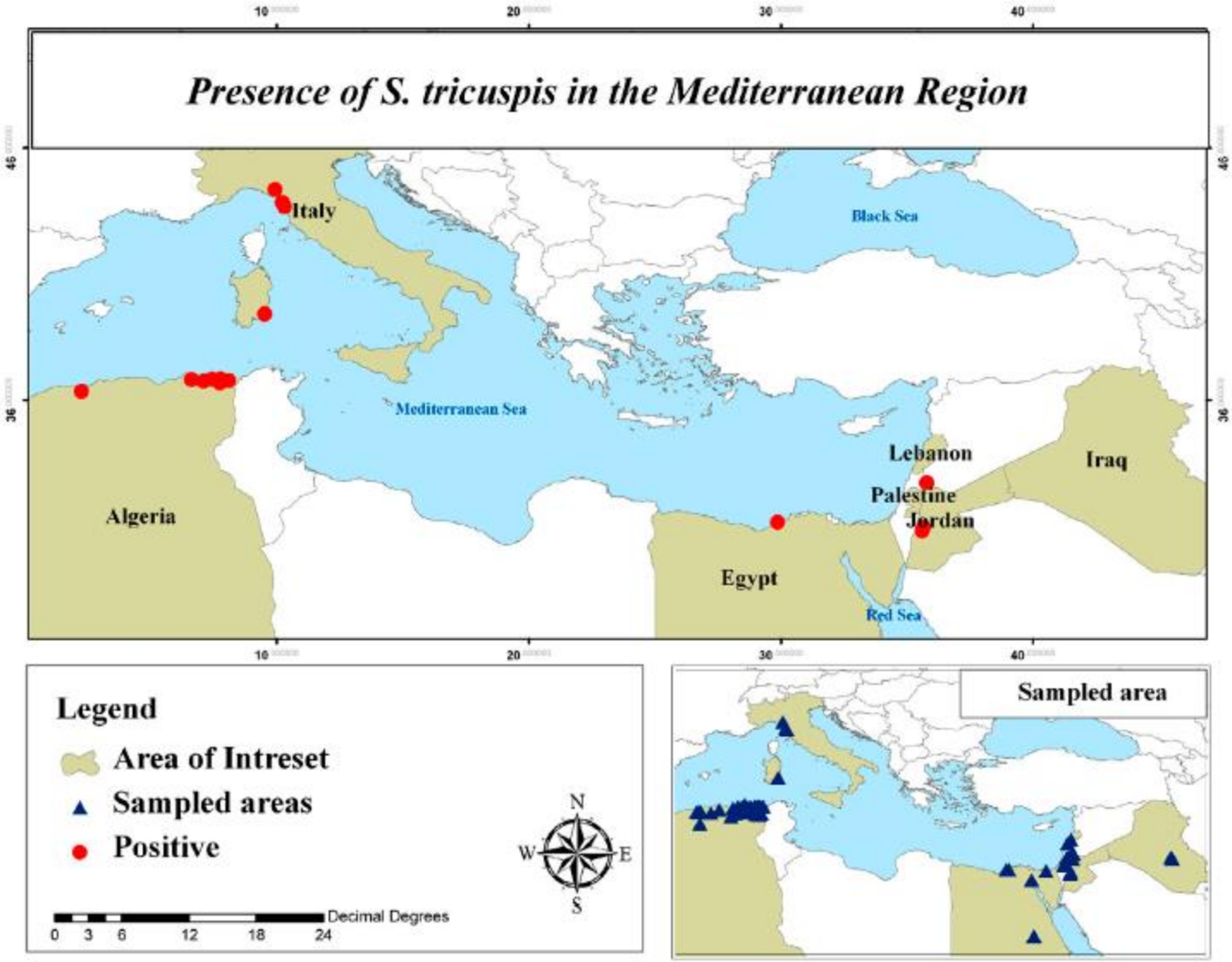



Figure 1. Presence of S. tricuspis in the Mediterranean Region

# *Thank you for your attention*