



Application of molecular methods in trophic ecology of useful predators within Mediterranean agriculture – a review

Barbara Anđelić¹, Lucija Šerić Jelaska¹, Tomislav Kos², Mišel Jelić¹,
Vedran Bahun¹, Kristijan Franin²

¹ University of Zagreb, Faculty of Science, Department of Zoology, Zagreb, Croatia, ² University of Zadar, Department of ecology, agronomy and aquaculture, Zadar, Croatia

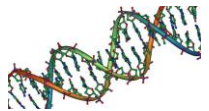
Outlines

- Introduction
- Molecular methods in ecology
- Trophic interactions in Mediterranean ecosystem– What has been done so far?
- Pesticides
- Perspectives
- Our project

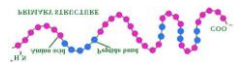
Molecular methods in ecological research

Different applications

1. Revealing trophic interactions



DNA → PCR (diagnostic PCR), qPCR, sequencing



protein → protein electrophoresis, ELISA

2. Pest control using sterilization by RNA silencing

3. Revealing insect vectors of fitopatogens

Reaveiling trophic interactions

DNA based methods vs. protein based methods

diagnostic PCR vs. NGS



depending on what
you are looking for

What has been done so far regarding Mediterranean ecosystem?



- Olive groves
- *Bactrocera oleae*

silencing experiments

trophic interactions → feeding experiments data
field data (who is feeding on *B. oleae*)



biological
control

Bactrocera oleae pupae



Ocypus olens



Pterostichus melas

new generation sequencing



screening for potential predators

What has been done so far regarding Mediterranean ecosystem?



- *L. botrana*
- Same of the predators identified
- More informations needed
- Carabid beetles potential predators on pupae

- *Byctiscus betulae*
- *Drepanothrips reuteri*
- *Empoasca vitis* (some informations from other agroecosystems)
- ...
- New informations about trophic interactions are needed

Open questions?

- What are the main predators of pest species in olive orchards and vineyards?
- How can we apply knowledge of trophic interactions to biocontrol?



Pesticides used in Mediterranean agroecosystems:

1. neonicotinoids

- Neonicotinoids
- Nicotinic acetylcholine receptors
- Negative effect on numerous pest but also beneficial insects

MEDITERRATRI → effects of pesticides
on beneficial predatory arthropods

2. Copper

- Copper based pesticides
- Used in Mediterranean agriculture
- Accumulation in the soil

MEDITERATRI → effects of pesticides
on beneficial predatory arthropods

Pesticides

Open questions

- What effect do they have on non-target invertebrates present in Mediterranean agroecosystem?
- Do they change trophic interactions?
- Are they transferred through soil by fungies?
- ...

Perspectivies

- Reveal trophic interactions in vineyards and olive groves
- Reveal predators for pest species present in vineyards and olive groves
- Propose biological control methods for pest species
- Reveal effect of used pesticides on non-target organisams

Shortly about our project



MEDITERATRI project

understanding the effect of pesticides on non-target invertebrates through trophic interactions in Mediterranean agriculture



Project team:
Lucija Šerić Jelaska, dr. sc.
(team leader)
Tomislav Kos, dr. sc.
Mišel Jelić, dr. sc.
Barbara Anđelić, mag. biol.
mol.
Vedran Bahun, mag. oecol

<http://www.pmf.unizg.hr/mediteratri>