

FAW Biological Control in the global south:

Natural enemies associated with fall armyworm in the NENA Region

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The Global Action for Fall Armyworm Control



Goals

- Improve food security & the livelihoods of millions of smallholder farmers
- Reduce environmental pollution through the control of FAW

Objectives

- to enhance global, regional, national & farmer-level coordination & collaboration
- To reduce crop yield losses
- To reduce the risk of further spread to new areas



USD 500 million over three years (2020 – 2022)



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**THE NENA REGION & GOALS/OBJECTIVES OF
FAW GLOBAL ACTION**
WHERE WE ARE?
WHAT HAVE BEEN ACHIEVED?



The Global Action for Fall Armyworm Control in NENA Region



Technical Cooperation Programmes

- National: Yemen (1), Egypt (2)
- Regional: Mashreq (1),
Maghreb countries (1)
- Global Action: Egypt



Quarantine & Phytosanitary measures

- Strengthen National Capacities



Monitoring & Early warning

- FAMEWS USE- Smartphones
- Pheromone Traps, killing strips, lures
- Data points, collection, validation,
- FAW platform



Awareness & Knowledge Management

- Training, workshops, seminars, meetings



Sound FAW Management

- Biological Control: Survey of natural enemies, Upgrading of Bio-control Labs-, equipment & tools
- Biopesticides & Rational Use of Chemical Pesticides (Demo Plots)



Validation of FAW Management Practices(Egypt)

- Monitoring, Detection, & Early Warning
- Agricultural Practices' technologies
- Biological Control
- Chemical Control



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The Global Action for Fall Armyworm Control In NENA Region



Farmer field Schools/ Extension

- Promotion & Adoption of FFSs Approach (Egypt, Yemen, Syria, Lebanon, Jordan, Palestine, Sudan, Mauritania...).

Partnership

- **ICIFE** - Technical Assessment of Natural Enemy's Production unit.
- CABI - identification of the suspected specimen

Communication

- Breaking language barriers: Translated books (Arabic)
- Videos
- Posters
- Brochures

COORDINATION

- National
- Regional
- International

Networks

- 17 National Focal points in the NENA Region
- 22 NFP meetings (Sept. 2022)





The Global Action for Fall Armyworm Control WAY FORWARDED IN NENA REGION





The Global Action for Fall Armyworm control

Voice of NENA Countries



Six FAO Projects & Technical Support in NENA Region



Egypt

TCPf/EGY/3704/C3

April - Dec 2019

TCP/EGY/3706

2020 - 2021

GCP /GLO/220/EC

2022 - 2023

Yemen

TCP/YEM/3701 (E)

1 Jan 2019 - 30 Jun 2021

Jordan, Lebanon, Syria Palestine

TCP/RAB/3803

23-Feb-2021 - 31-Mar-2023

Algeria, Libya, Mauritania, Morocco, Tunisia

TCP/SNE/3901

22-Mar-2022 - 31-Dec-2023

Technical Support

● Egypt 2019

- Urgent Training

● Sudan / 2016

- ToT workshop
- Exchange visit to Ethiopia
- Providing monitoring tools

● Saudi Arabia / 2019 -2022

- Developing a national action plan
- Awareness training
- FAW pest reporting

● UAE / 2019

- Training program
- Providing monitoring tools
- Developing a national action plan
- Proposal for the biological control unit

● Iraq / 2021 - 2022

- Providing monitoring tools
- Technical support



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WAY FORWARDED IN NENA REGION



- Preventing FAW Introduction & Spread
- Improving the Phytosanitary Measures
- Early Warning System & Monitoring

Not known to be present

- Algeria
- Tunisia
- Morocco
- Bahrein
- Kuwait
- Qatar



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WAY FORWARDED IN NENA REGION



Present

- Yemen
- Egypt
- Sudan
- Jordan
- Lebanon
- Syria
- Palestine
- Iraq
- Libya
- Mauritania
- Oman
- Saudi Arabia
- United Arab Emirates

STRENGTHENING SUSTAINABLE MANAGEMENT OF FAW

Agricultural practices

- Resistance varieties
- Agricultural practices
- Intercropping

Biological Control

- More natural enemies Survey
- Upgrading biological control labs
- Establishing centres specified for the mass production of NE & bio-pesticides

Chemical Control

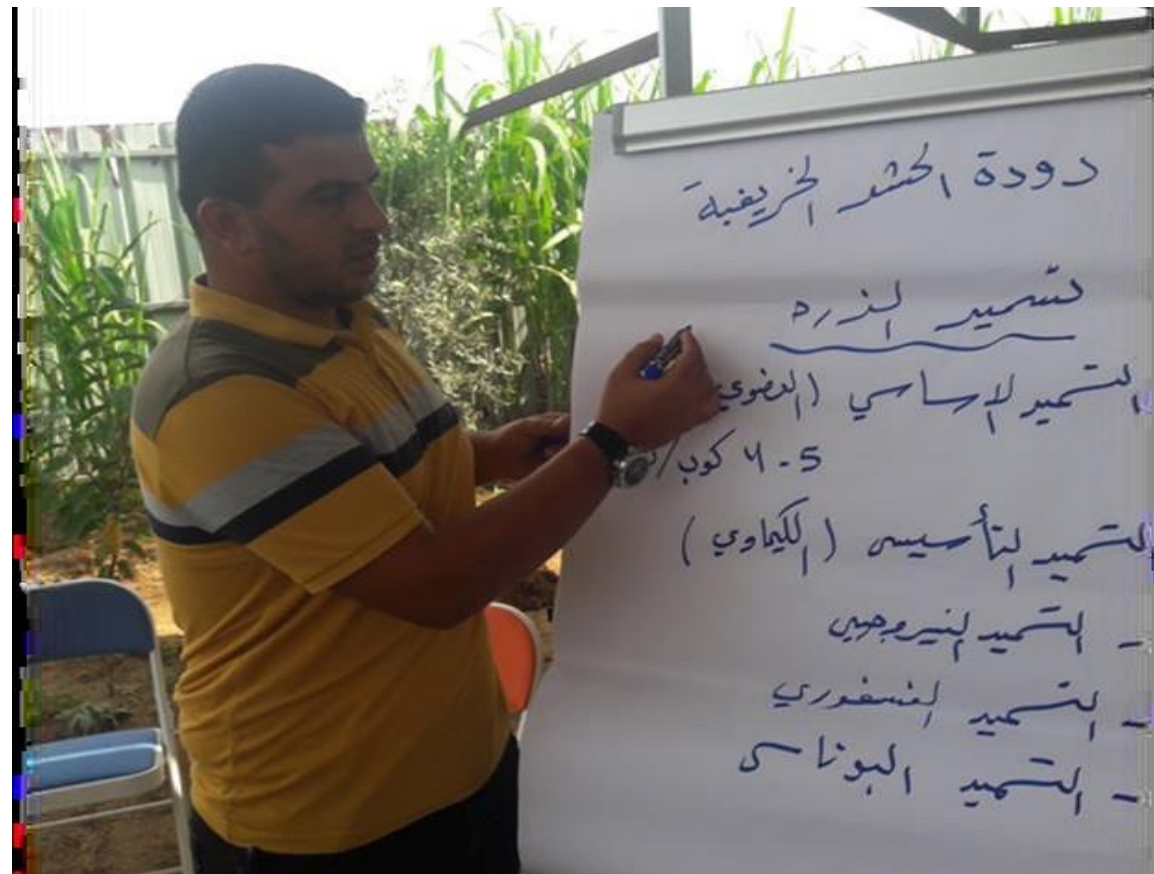
- Rational use of pesticides
- Pesticides registration
- Obsolete pesticides



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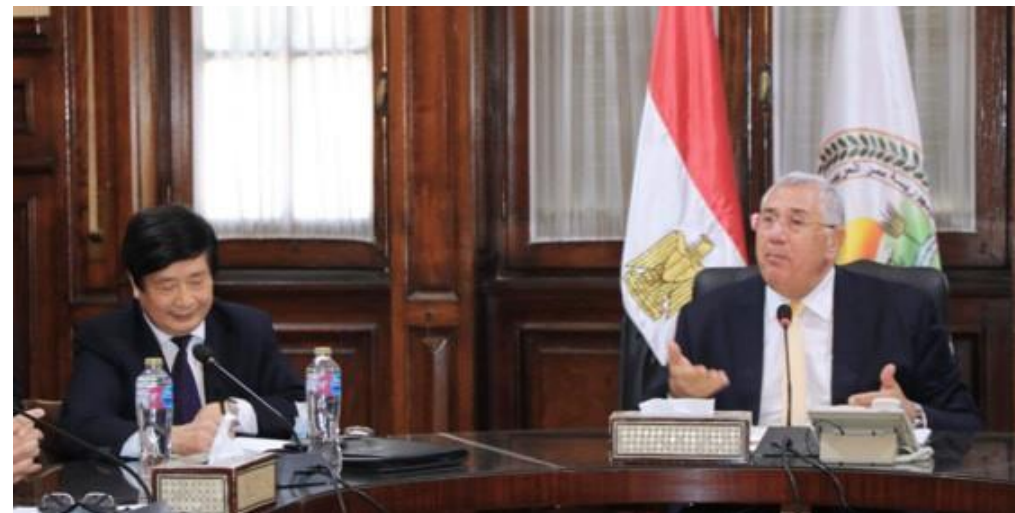
FARMER FIELD SCHOOLS (FFSs): Promotoion & Adoption



WAY FORWARDED IN NENA REGION

Strengthening coordination of actors from different sectors

- GOVERNMENT
- PRIVATE SECTOR
- FARMER GROUPS
- NONGOVERNMENTAL ORGANIZATIONS [NGOs]



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WAY FORWARDED IN NENA REGION



Strengthening gender involvement



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Stakeholders & Stakeholders Engagements

Government

Private sector

Farmer groups

NGOs

Farmers

Researchers

Academia

Donors

RPPO

WAY FORWARDED IN NENA REGION

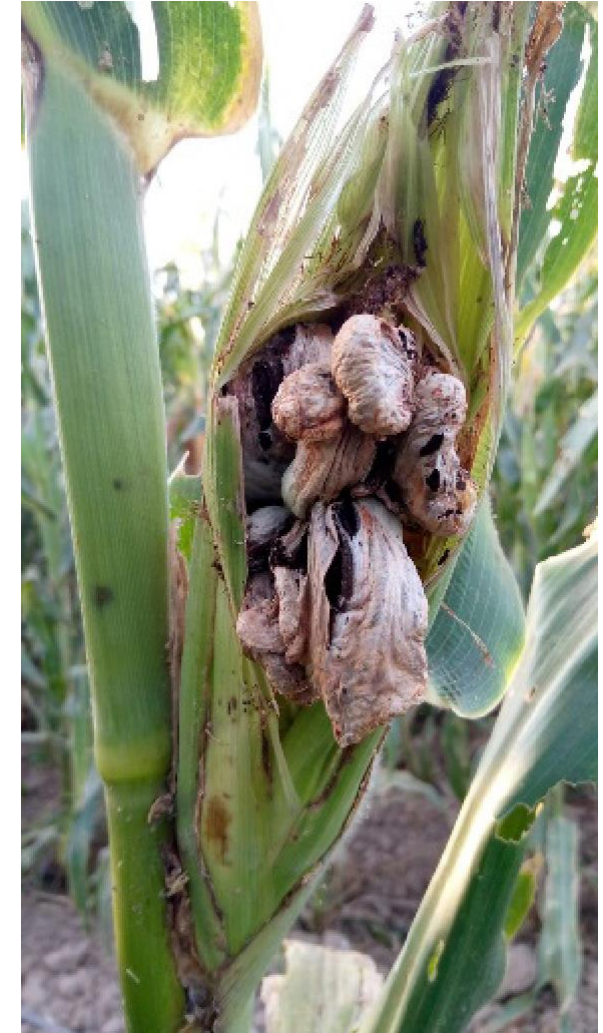
- Application of Integrated Pest Management (IPM)
- Communication & Partnership
- On Policy and Farmers Field School



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Challenges significant damages on maize



Training course on mass rearing of fall armyworm, its natural enemies and the use of natural enemies in the management of the pest, Egypt

23th to 24th November 2020



Collaboration between ICIPE and FAO



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Training Highlights

- Mass rearing of host insect, fall armyworm (*Spodoptera frugiperda*), for use in mass production of parasitoids
- Mass rearing of egg and larval parasitoids
- Basics on parasitoid release and recovery
- Training on quality control for mass rearing/production of natural enemies
- Basics on entomopathogenic fungi, their diversity, isolation and mass production



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Strengthening national capacity building of natural enemies



Mass culture of *Trichogramma* and *Telenomus* for use in biological control program against the FAW

Malick Ba



Mass production and Application of Bt in China

Liu huamei

- Brief introduction of Bt
- Mass production of Bt
- Application of Bt



- Granule
- 0.5mm size
- 8000 particle/g



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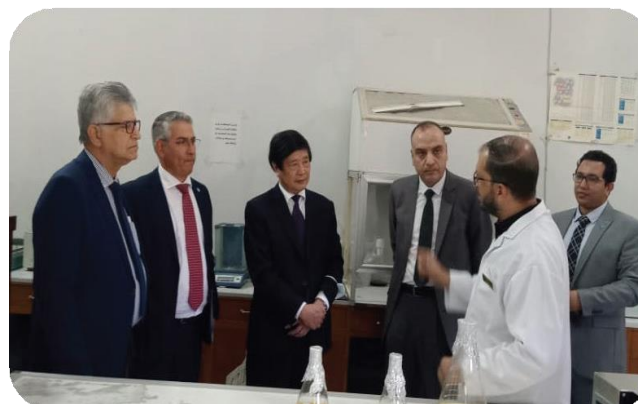


Strengthening national capacities on natural enemies

Upscaling the natural enemies lab in Shandaweel



Upscaling the natural enemies lab
provide equipment, tools, and capacity
building



Visit to the Biopesticide Production Unit
in Egypt 19th June 2022

The lab considered to be one of the
best in Egypt for mass rearing and
releasing of *Telenomus* and
Trichograma



Visit the natural enemies Lab-Suhag
Egypt 20th June 2022



Bio-Agriculture Services center in
Aswan- Egypt 22 June 2022



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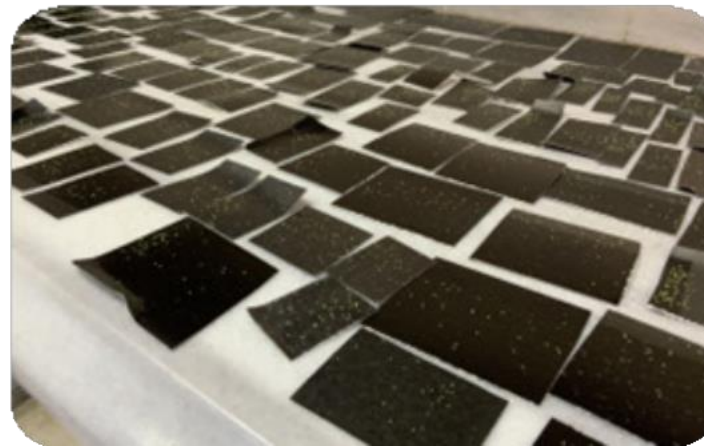


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Strengthening national capacities on natural enemies



Five natural enemies centers are in Syria for mass rearing natural enemies and capacity building of national and regional trianees and Bt production



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Strengthening national capacity building on natural enemies

Exchange expert visits between countries



Egypt



Jordan



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Strengthening national capacity building on natural enemies



Establish a new natural enemies lab in Jordan

Training of the Jordanean bio lab in Syria

The bio lab is running now properly



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Survey of natural enemies in NENA countries

Hymenoptera

1. *Habrobracon hebetor* / Braconidae
2. *Chelonus* sp. / Braconidae
3. *Crematogaster scutellaris* / Formicidae
4. *Vespula pensylvanica* / Vespidae

Heteroptera

5. *Geocoris erythrocephalus* / Anthocoridae
6. *Orius insidiosus* / Anthocoridae
7. *Macrolophus caliginosus* / Miridae

Neuroptera

8. *Chrysoperla carina* / Chrysopidae
9. *Mantispa syriaca* / Mantispidae

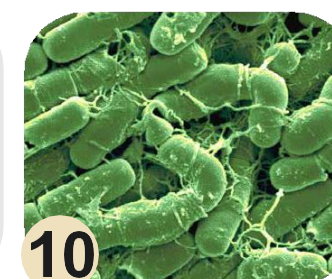
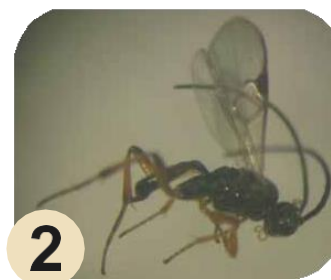
Dermaptera

10. *Forficula smyrnensis* / Forficulidae



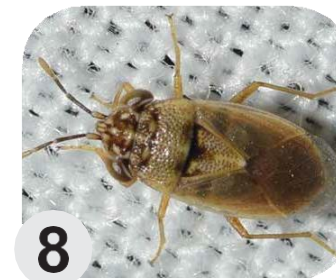
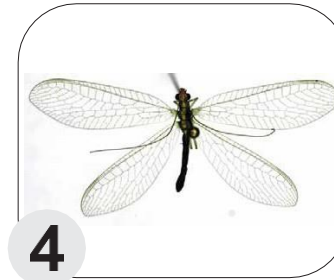
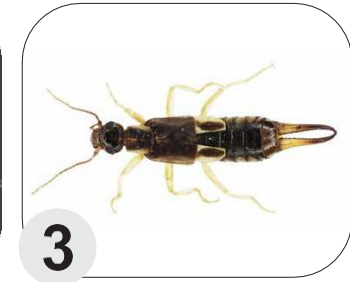
SYRIA

1. *Trichogramma principium*
2. *Cotesia glomerata* (Hymenoptera: Braconidae)
3. *Bracon brevicornis*
4. *Chrysoperla carnea* (Chrysopidae: Neuroptera)
5. *Hippodamia variegata* (Coleoptera: Coccinellidae)
6. *Coccinella septempunctata* (Coleoptera: Coccinellidae)
7. *Creontiades pallidus* (Rambur 1839) (Hemiptera: Miridae)
8. *Orius* sp. (Anthocoridae: Heteroptera)
9. *Delta* sp. (Hymenoptera: Vespidae)
10. *Bacillus thuringiensis*



JORDAN & PALESTINE

1. *Chelonus inanitus* / (Brachonidae: Hymenoptera)
2. *Telenomus remus* / (Hymenoptera: Scelionidae)
3. *Lapidura riparia* / (Dermaptera: Labiduridae)
4. *Chrysoperla carnea* (Neuroptera: Chrysopidae)
5. *Hippodamia tredecimpunctata* (Coleoptera :Coccinellidae)
6. *Orius niger* (Hemiptera: Anthracoridae)
- (Hemiptera: Lygaeidae)
7. *Geocoris ater*
8. *Geocoris phaeopterus*
9. *Geocoris chloroticus*



Egg - Larval parasitoids:

1. *Telenomus remus* Nixon, 1937
2. *Trichogramma minutum* Riley, 1871
3. *Chelonus insularis* Cresson
4. *Chelonus intermedius*

Larval parasitoids:

5. *Meteorus laphygmae* Viereck 1913
6. *Pseudogonia rufifrons* (Wiedemann)
7. *Microplitis* sp. Foerster, 1862
8. *Exorista* (Tachina) larvarum
9. *Exorista* (Podotachina) sorbillans
10. *Dinarmus basalis*
11. *Cotesia ruficrus*
12. *Microplitis rufiventris*
13. *Megaselia scalaris* (Loew)
14. *Barylypa rufa* Holmgren, 1875



Strengthening national capacity building on pesticides application



Safe use of insecticides

- Increase farmers awareness through Farmer Field Schools on the risk of pesticides and the side effect and residue on health of operator, and consumers
- Eliminating harsh insecticides,
- Reducing the frequent application
- Using the biorational safe products (Bt, Azadirachtin, Spinosad and Emamectin benzoate)
- Apply only at the early stages of maize (until 12 leaves)





Biological control of FAW in Syria



How to use the traps

Communication Video

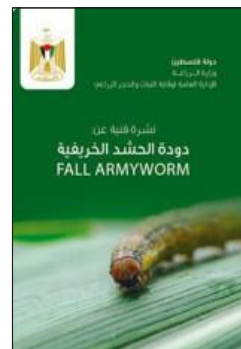
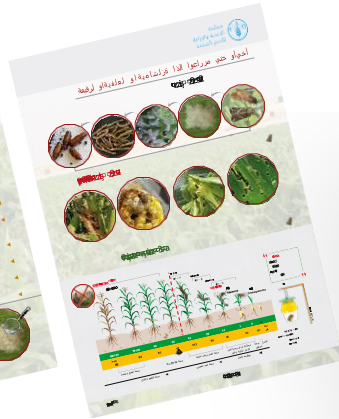


FAW in Egypt




Biological control of FAW in Lebanon

Publications



• Master thesis in Jordan


Mutha University
College of the Graduate Studies

Novel ecofriendly management tactics of the fall armyworm *Spodoptera frugiperda* (J.E. Smith) (Lepidoptera: Noctuidae) and its preference for different cultivars of maize in Jordan

By
Saba Mohammad Jum'ah Albeshoosh

Supervisor
Prof. Firas Ahmad AL-Zyoud

Co-Supervisor
Dr. Muawya Alasafa

A Thesis Submitted to the Deanship of the Graduate Studies in Partial Fulfillment of the Requirements for the Degree of Master of Science in the Department of Plant Production Mutha University, 2022



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