RECOMMENDATIONS FOR ACTIONS IN LAO PDR

- Improve forecasting of FAW outbreaks and the dissemination of information about increasing population numbers across central, provincial and district levels. Early detection of FAW infestations can enable more effective release of predators or use of pathogens.

- Improved collaboration between agriculture agencies and companies which supply seed for planting (to ensure that more resistant corn varieties are available and that farmers receive advice on the best growing practices).

- Research and development to:
  - Identify components of Integrated Pest Management (IPM) suitable for small-scale farmers. IPM is likely to include:
    - Planting of resistant varieties such as PACIFIC 777 and PACIFIC 779 and;
    - Crop rotation;
    - Biological control (using predatory stink bugs, parasitoids and pathogens which farmers can multiply themselves);
    - Application of plant extracts (which farmers can mix from inexpensive, locally available ingredients) such as Guduchi, lemon glrss and galangal.
    - Management options for pests other than FAW.
  - Soil management.
  - Drought is also a problem for corn production; drought tolerant corn varieties are should be considered.

- Improved extension capacity, including:
  - Development of extension materials covering monitoring and treatments;
  - Training of provincial and district agriculture officers so that they, in turn, can provide training and advice to farmers.

LURAS Briefing note: 01/2021

The Lao Uplands Rural Advisory Service (LURAS) is a program of the Swiss Agency for Development and Cooperation (SDC) and the Government of Laos, implemented by Helvetas in partnership with the Departmentof Technical Extension and Agro-Processing (DTEAP).

BRIEFING NOTE FARMER ACTION RESEARCH ON FALL ARMYWORM MANAGEMENT IN LAO PDR

ISSUES/ CHALLENGES

Larvae (caterpillars) of the Fall armyworm (FAW), *Spodoptera frugiperda* (J.E. Smith) (Order Lepidoptera: Family Noctuidae) are highly destructive, polyphagous pests of a wide range of agricultural crops, especially grassy crops such as corn, sorghum, sugarcane and rice. Originating in the Americas, FAW spread to Africa in early 2016, where it caused great losses to farmers. By December 2018, FAW had reached India.

The adult moths of FAW fly strongly and disperse rapidly over large distances. The species was first detected in Laos in Vientiane capital in January 2019, and by June, 2019 had been recorded in all provinces. Adult moths now probably move freely from district to district and eradication is not possible.

In Laos and neighbouring countries, FAW has shown a strong preference for plantings of corn. Without management, FAW can cause almost total loss of a corn crop. Corn is an increasingly important subsistence and cash crop for Lao farmers, especially small-scale farmers.

Management of FAW by application of pesticides is too costly for most small-scale, Lao farmers. Also, when corn has grown tall it is dangerous for farmers to spray pesticides or any other toxic chemicals because any spray which does not land on the plant falls back onto the operator of the spray pump.

It is essential to develop low-cost and safe, management practices for FAW and assist Lao farmers to adopt these practices. Application of dish washing soap + plant oil, using chickens as predators, spraying plant extract (neem, Guduchi and tobacco), and releasing an insect pathogen (*Bacillus thurigiensis*) and a beneficial insect (predatory stink bugs) have all had some success in trials over in two wet seasons (maize) and one dry season (sweet corn) in Kham, Xieng Khouang province 2019-2020 and in another dry season in 2021 in Thathom, Xaisomboun, with some supporting information form surveys in corn fields in Vientiane capital.

Farmers have been using different corn varieties (LVN 10, PACIFIC 777 and 779, and C.P. 535) and these have had differing effects on FAW feeding.

RESULTS FROM FARMER ACTION RESEARCH

- Some promising practices and treatments have been identified, but significant work still needs to be done to apply these effectively in different parts of Laos. Some management options will depend on early detection of FAW caterpillars in a crop and this may be challenging, for example, because of the small size of the first stage caterpillars.

- FAW is not the only problem for corn production. The present research has found several additional and significant insect pests infesting corn (attachment, Fig. 1) and drought has also been a serious problem from 2018 to 2020.

- The variety LVN 10 has shown low FAW damage to the vegetative parts of the plant (leaves, stalk etc) but high damage to the cob. It was the opposite with PACIFIC 777 and 779, which showed high damage on the vegetative parts of the plant but low cob damage.

- For a variety of reasons, Lao farmers are not achieving the yields which are theoretically possible from their plantings of corn. Better selection of varieties, improved soil management and control of pests in addition to FAW, all could improve the profitability of corn as a crop.

- It is of great interest that many beneficial insects and insect pathogens were found in corn fields (attachment, Figs 2–4). These could be useful for applying IPM techniques to pest management.

- It is possible that strains of FAW which prefer other crops could emerge or enter the South-East Asian region. In Laos FAW has caused minor damage on grasses, but, thus far, FAW has not become a pest of rice.

ATTACHMENTS

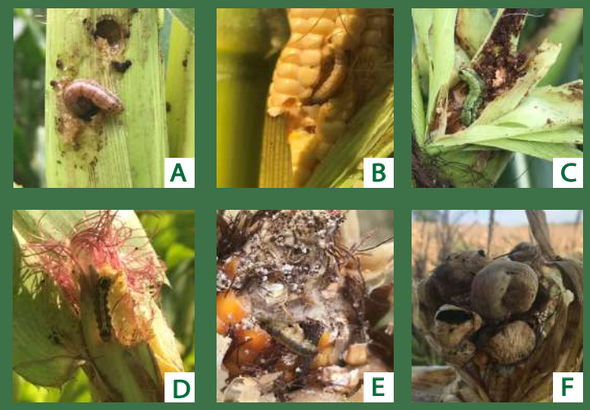
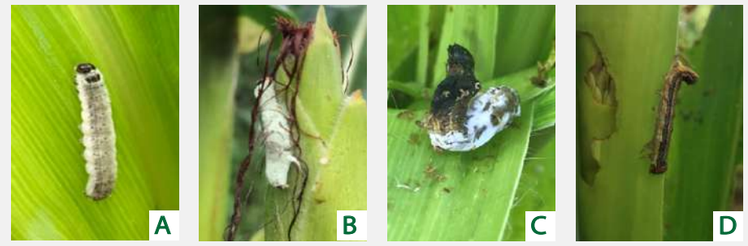


Fig 1: Important insect pests and diseases found damaging corn cobs found in field research:

A) Fall armyworm
B) Asian corn borer
C) Corn earworm
D) Tussock moth
E) Unidentified Pyralidae
F) Corn smut.

Fig 2: Insect pathogens of FAW Larvae: affected by

A,B) Nomuraea sp
C) Beauveria bassiana
D) Nuclear Polyhedrosis Virus (NPV).



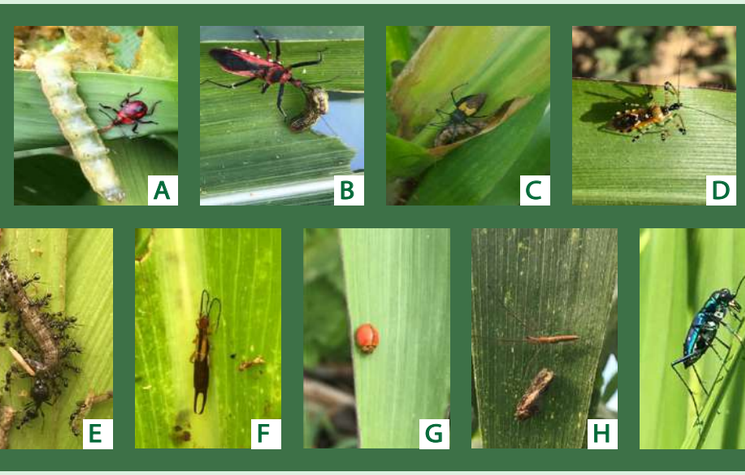


Fig 3: Predators:

A) Stink bug (Eocanthecona furcellata)
B) Assassin bug (Rhynocoris sp.)
C) Assassin bug (Sycanus collaris)
D) Assassin bug
E) FAW larva being eaten by ants
F) earwig
G) lady beetle
H) FAW moth eaten by spider
I) tiger beetle.

Fig 4: Parasitoids:

A,B) cocoon and adult (Charops sp.)
C,D) cocoon and adult (Cotesia sp.)
E,F) cocoon and adult (Microplitis sp.)
G) Chelonus sp
H) Telenomus sp.