Department of
Primary Industries and
Regional Development
GOVERNMENT OF
WESTERN AUSTRALIA

Protect
Grow
Innovate

31 July 2024

Industry update #9 – Fall armyworm

What happened in the east in early 2024?

During January and February this year, the eastern part of Queensland experienced its most severe infestation of fall armyworm (FAW) on record. In contrast to the patterns observed with FAW infestation in 2021 to 2023, an exceptionally high population of FAW infested crops such as maize and sorghum through the entire growing season. What sets this year's infestation apart from previous years, is the unprecedented occurrence of significant FAW infestation and resultant damage during the critical reproductive phases of crops such as maize (from silking to maturity) and sorghum (from flowering to maturity).

The probable cause for the outbreak this season can be linked to warmer winter and spring temperatures. These favourable conditions accelerated the pest's breeding cycles, resulting in a significant population build-up early in the season. Additionally, late planting of crops due to unfavourable field conditions may have exacerbated the situation, leaving the most susceptible phases of plant growth, such as the vegetative phase, to periods of high FAW pressure.

FAW activity in the Ord River Irrigation Area in 2024

In the Ord River Irrigation Area (ORIA), field reports indicate a significant increase in FAW pressure in maize during the 2024 season, compared to previous years. Despite the average temperature in 2024 not differing significantly from past years, there was higher rainfall during the wet season in the ORIA. This increased moisture may have facilitated the growth of FAW's alternate hosts while its primary hosts (maize and sorghum) were not in cultivation.

Previous research by the Department of Primary Industries and Regional Development (DPIRD) has shown that FAW can sustain itself on alternative hosts such as rangeland pastoral grasses (for e.g. rhodes grass, blue grass, and barnyard grass), which are more favourable than legume pastures (for e.g. cavalcade, butterfly pea, and siratro). Other factors, such as moth migration, also may be likely to contribute to the rapid build-up of FAW populations. However, due to the absence of field data or studies, establishing a direct correlation between these factors and the FAW population explosion is challenging.

Given FAW outbreaks can be significantly influenced by various environmental factors, it is crucial for growers and agronomists to maintain vigilance and closely monitor for signs of FAW activity, especially during critical stages of crop growth. Early detection and timely intervention are paramount to minimise potential crop losses.

DPIRD activity

Pheromone traps have been strategically deployed in the ORIA to monitor FAW moth activity this season and the data collected is being shared with local agronomists. Pheromone trap capture data from the past 2 years in the ORIA reveal a pattern where FAW activity typically begins to increase from June onwards, with a significant rise observed from July through to December. These findings emphasise the importance of enhancing crop monitoring and surveillance during these months when moth activity is known to be higher.

When to initiate management options?

Though economic threshold for FAW damage is not yet available and in early stages of development, preliminary results from projects (undertaken in Queensland) to develop thresholds in sorghum crops has indicated that visual inspection of damage only provides an indication of the history of damage and will not tell what the infestation will lead to in terms of crop loss. To determine this, it is recommended that a destructive plant sampling be undertaken to determine the number and size of FAW larvae feeding within the plant. For example, in sorghum, preliminary results show that the presence of 1 or more medium to large larvae in the crop for more than a week will cause significant crop loss.

Reports from both overseas and Australia have highlighted that FAW populations exhibit resistance to synthetic pyrethroids, organophosphates, and carbamates, rendering these pesticides ineffective for control. Previous insecticide resistance testing, in collaboration with New South Wales Department of Primary Industries (NSW DPI) has confirmed reduced susceptibility of FAW populations in Western Australia to Group 1A and 1B insecticides (organophosphates and carbamates). Consequently, it is crucial to employ alternative insecticides for effective management.

In Australia, effective integrated pest management strategies against FAW include the use of insecticides such as chlorantraniliprole, indoxacarb, spinosyns, and emamectin benzoate. However, due to the pest's propensity to rapidly develop resistance, it is recommended to rotate between different modes of action. This rotation strategy helps mitigate selection pressure and reduces the likelihood of resistance development.

To validate the efficacy of insecticide sprays against FAW, it is advisable to conduct destructive sampling to assess their impact on larval populations a few days after application. Effective control is typically indicated by the emergence of new, undamaged leaves on maize plants, indicating that the pests feeding within the plants have been successfully eradicated. DPIRD will continue collaborating with NSW DPI and other organisations to conduct regular monitoring of insecticide resistance in FAW populations across Western Australia. This ongoing effort is essential to adapt and refine management strategies in response to evolving resistance patterns, ensuring sustainable pest control practices for maize and other affected crops.

Updates on FAW biological control agents

Due to the recent arrival of FAW in Australia in 2020, there is limited information available on the natural mortality of this invasive pest caused by biological control agents. To address this knowledge gap, a collaborative project funded by Hort Innovation was initiated across Queensland, Western Australia, New South Wales, and Northern Territory.

Field sampling was conducted from 2021 to 2022 where a total of 961 parasitised FAW larvae were recovered, with observed parasitism rates ranging from 1.3% to 47%. Several hymenopteran parasitoid species emerged from FAW larvae, including *Cotesia ruficrus*, *Cotesia icipe*, two *Chelonus* species, two *Coccygidium* species, *Eriborus* species, *Microplitis abrs*, *Temelucha* species, a new Eulophid species, and *Euplectrus frugiperdata*. Dipteran larval parasitoids included 2 tachinids (*Exorista xanthaspis* and *Drino species*), 2 unidentified tachinids, and 1 phorid (*Megaselia scalaris*). Additionally, 2 egg parasitoids, *Trichogramma pretiosum* and *Telenomus* species, were also collected.

In Western Australia specifically, 1 egg parasitoid and 6 larval parasitoids were documented. These included *Cotesia ruficrus*, a new eulophid wasp species, *Euplectrus frugiperdata*, 2 new braconids, *Coccygidium necatrix* and *Coccygidium mellosiheroine*. *Trichogramma pretiosum* was found in FAW eggs, but notably only at the DPIRD Kununurra Research Station where sentinel eggs were deployed.

DPIRD will continue undertaking research in this area with future efforts focusing on studying the seasonal abundance and population dynamics of these biological control agents against FAW.

Resources:

- Fall armyworm infestations through January and February the most severe we've seen | The Beatsheet
- Fall armyworm in Western Australia | Agriculture and Food
- Fall armyworm in maize | The Beatsheet
- Managing FAW in sorghum – is there a threshold yet? | The Beatsheet