BANANA WEEVIL BORER CONTROL

Adult weevil borer

The banana borer, a black weevil, *cosmopolite sordidus*, ***is a phytophagous insect specific to bananas. It is one of the most important pests in bananas and plantain.***

1. BIOLOGICAL CYCLE AND SYMPTOMS

Adult females bore hole into banana corms where they lay their eggs, of about 2mm long. One female lays 50 to100 eggs per year.

Larvae hatch after one week and burrow tunnels to feed. These tunnels weaken the banana; they damage the root system and seriously increase the risk of toppling. In case of heavy infestation, feeding and development of the banana is disturbed and may cause significant yield loss. Larva activity is detected by the presence of their brown excrement in the tunnels. Damage on the banana is exclusively due to larval activity.

After 5 or 7 weeks of larval stage, larva turns into red-brown (young imago) then black adult, about the size of a thumb nail.

Adults leave the corm by drilling galleries to the soil surface. Adult weevils move at nights by walking. They feed on moist vegetal debris where they hide: a CIRAD study on weevil movements showed that they move rather into or towards plant residues. Their life expectancy is very long (over 2 years in farming).

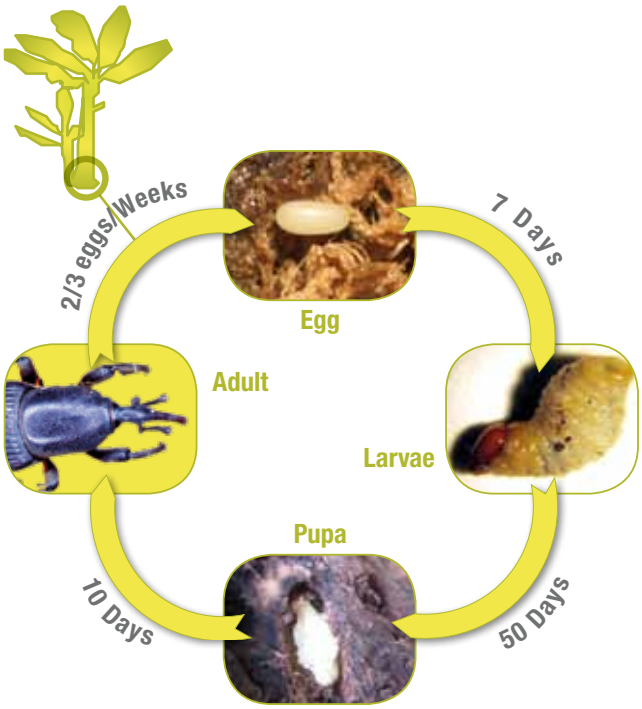

DIAGRAM: WEEVIL'S LIFE CYCLE. PHOTOS: CIRAD

Field view of weevil attack - Photo Cirad

As adult populations live in clusters, plot infestation is generally heterogeneous.

Weevil galleries - Photo Cirad

2. EVALUATION OF INFESTATION AND MONITORING OF POPULATIONS

2.1- Evaluation of infestation by shelling

The level of plot infestation by weevils can be evaluated by shelling. The shelling is carried out on freshly harvested plants: at least 50 plants per hectare to obtain a reliable diagnosis.

DIAGRAM: WEEVIL INFESTATION COEFFICIENT ON CORM

You must gradually dissect the banana corm and carefully identify the galleries and the number of larvae found within.

- Scoring of infestation coefficient is as follows:
  - **0:** no galleries,
  - **5:** traces of galleries,
  - **10:** net attack but localized on less than a quarter of the circumference,
  - **20:** galleries present on a quarter of the corm circumference,
  - **40:** galleries present on half of the corm circumference,
  - **60:** galleries present on three quarters of corm circumference,
  - **100:** galleries present on the entire corm circumference.

- When 5 to 10 % of plants of a plot are affected by an attack greater than coefficient 20, chemical or biological control becomes necessary.

2.2- Monitoring populations

- The evolution of weevil populations can be followed through the information on the number of weevils captured in pheromone traps. For this surveillance, a number of 4 traps/ha is required. If more than one weevil is captured by the trap per fortnight, then control by mass trapping with pheromone traps becomes necessary.

What is a pheromone trap?

- Male weevil produces aggregation pheromones (grouping signal) which attracts other males and females; the pheromone (Sordidine) is a mix of 4 synthetic isomers which artificially reproduce this phenomenon.

- Sordidine traps consist of pheromone and synergist (substance improving the efficiency of the pheromone) placed in a box: moving adult weevils are attracted by the pheromone and drown (soap water trap) or remain trapped (dry trap with collar).

- One pheromone trap captures weevils present in a radius of about 15 meters.

Pheromone trap in field - photo BANAMART

Pheromone trap with pod - Photo IT²

Trap and pheromone in gel - Photo IT²

Pheromone trap with pellets - Photo IT²

Dry trap - Photo IT²

3. CONTROL METHODS

3.1- Chemical control

One product is currently registered against the banana weevil, Nemathorin ® 10G (fosthiazate) at a dose of 20 g of commercial product per plant. It is primarily a nematicide with an insecticide secondary action – as no insecticide is registerded against banana weevil. Therefore biological control, which has been proven now, is recommended.

3.2- Biological control with traps

To reduce excessive population of weevils in producing plots, it is recommended to have 8 to 16 traps per hectare. Beyond 16 traps / ha, population control seems only slightly improved.

The control of weevils by trapping must be done on a long term and permanent basis. Efficiency is obtained through maintenance and monitoring of traps regularly and systematically every 15 days.

Infestation of plots is generally heterogeneous. Feel free to move traps that capture less and transfer them as reinforcement to more infected areas.

4. CONDITIONS OF THE EFFICACY OF BIOLOGICAL CONTROL

Ensure that plot is clean by fallow or cultural rotation.

Use clean planting material (tissue culture) for planting. Weevils spread from field to field through infested plants.

At harvest cut pseudo stems as high as possible. Pseudo stems serve as food and refuge to weevils.

Accelerate the destruction of harvest residues or fallen plants by cutting them into small pieces and prevent them from becoming a support for weevils.

Maintain a good sanitary aspect of plot especially drainage (development of C. sordidus is encouraged by humid soils).

Do not leave your fields in an abandoned state; quickly destroy fields to be replanted.

Trapping during fallow

Trapping is very efficient during fallow implementation; it's the first step for weevil control. Indeed, it is during the first plowing that populations will move in mass to neighboring plots and be trapped (since their habitat and resources were destroyed).

It is recommended to install a ring of traps in the first 4 to 6 months after destruction of the plantation, by placing traps every 20 meters around the perimeter of the plot in fallow.

Adjacent plots must also be protected by a ring of traps (one every 20 meters)

IT² is actually working on a complementary method of control, which consists in using a natural parasite of weevil, the fungi *Beauveria bassiana*.

Links to Bananagap frame of reference V5: CB 7.1 to CB 7.6 Integrated control.

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PERSONAL NOTES :