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Fall Armyworm (*Spodoptera Frugiperda*) Rearing

The first outbreak reports of fall armyworm in Zimbabwe were in September 2016. The Plant Protection Research Institute (PPRI) in the Department of Research and Specialist Services has since done some rearing experiments of the pest in order to understand its life cycle under the Zimbabwean environment. The latter was a precursor to the planned chemical efficacy experiments for the purpose of facilitating their registration for use on fall armyworm in the country, as well as to determine effective dosages that could be used farmers with minimal adverse effects on the environment.

Samples of larvae and eggs were collected from fields for rearing under room condition. Young maize plants were used as natural diet for the developing larvae. The adults were provided with water and honey on soaked cotton wool. The adult moth is greyish in colour. The forewings of the male are a mottled greyish colour with white markings near the wing tips. The forewings of the female are similar, but the markings are less distinct (Fig 1 (a) and (b)).



Fig 1 (a): Fall Armyworm adult female



Fig 1 (b) Fall Armyworm adult male

The female takes about 7-17 days after emergence from the pupal stage for it to lay eggs. **Note that information on egg laying period and adult lifespan in our environment, is still under observation.**

Egg Laying

Eggs are laid at night on the leaves, stuck on either or both surfaces of leaves in tight clusters (Fig. 2 (a) and (b)).



Fig 2 (a): Fall Armyworm eggs in a tight cluster just after being laid.

Fig 2 (b): The eggs a few days after being laid.

Fig 2 (c): Hatching of eggs, showing hatchlings.

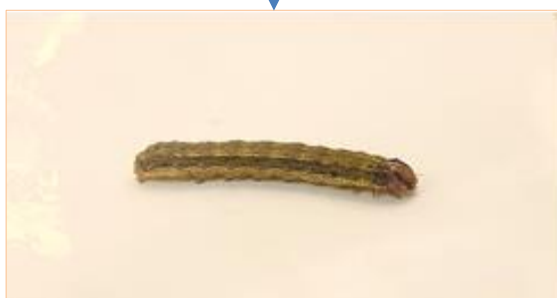
Hatching of eggs takes about 2-5 days (Fig 2 (c)). The young larvae feed on the leaves, with the first two instars feeding on the underside of the young leaves causing a characteristic skeletonizing or ‘windowing’ effect. Before maize tasselling, the older larvae feed deep in the whorl/ maize plant funnel. The larval development goes through six instars and takes 24-31 days (Fig. 3 (a)). Pupation takes place inside a loose cocoon in soil or between the leaves or cob of the host plant. The pupal stage takes 9-13 days (Fig. 3 (b)). Adults then emerge from the pupa at night.



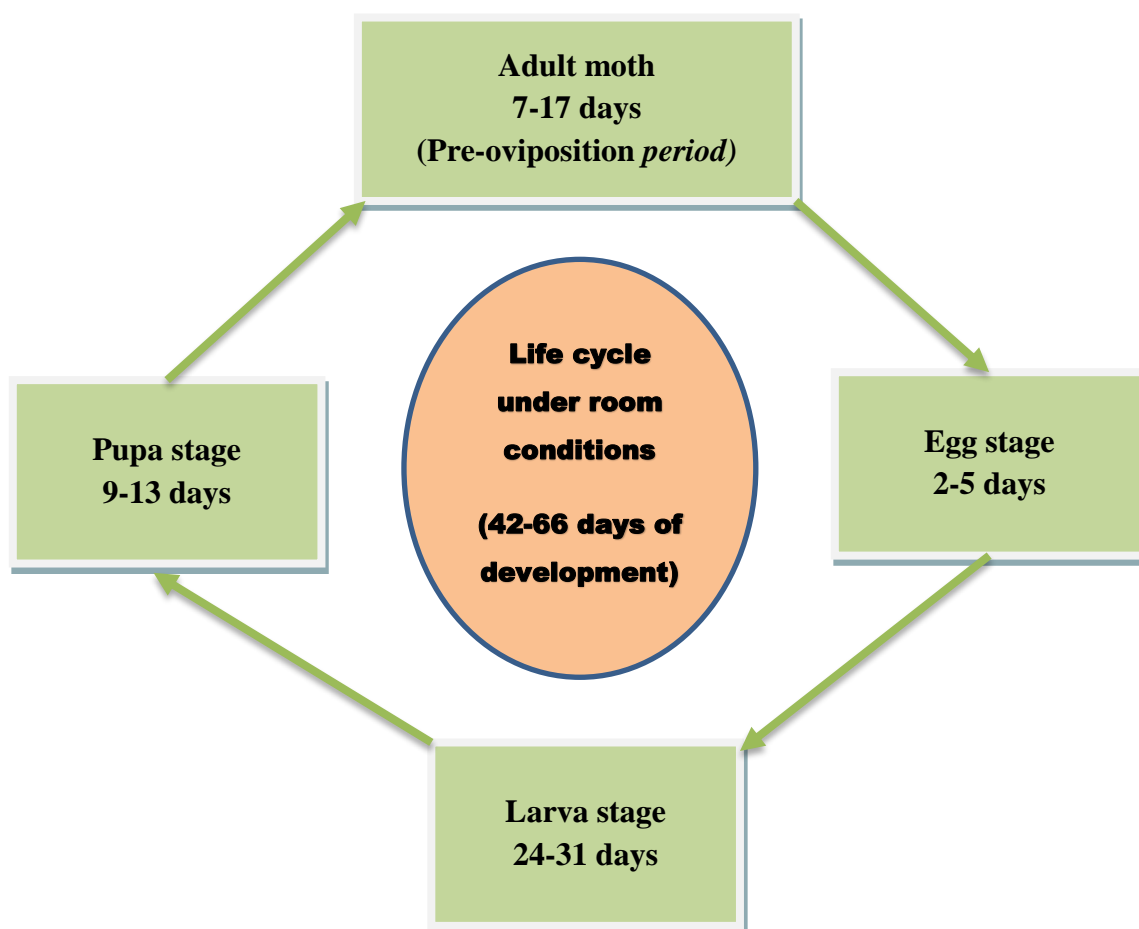
Fig. 3 (a): Larval Stage of fall armyworm.



Fig. 3 (b): Pupal stage of fall armyworm.



Fall Armyworm Development Cycle Observed



Chemicals on Temporary Registration

Insecticides in Table 1 have been granted temporary registration based on efficacy trial data collected in Zimbabwe. The exception is for **Belt 480SC**, where Bayer applied for temporary registration using efficacy trial data from South Africa.

Table 1: Products granted temporary registration status (One year)

Active Ingredient	Trade Name	Company
Gamma Cyhalothrin	Vantex 60CS	Pivotal Agro Services
Emamectin Benzoate	Emmamectin Benzoate	Polachem
*Flubendiamide	Belt 480 SC	Bayer

Additional work to screen more pesticides for use on fall armyworm in the country is planned. During the pest outbreak in 2016/17, other chemicals used by farmers, with reasonable success included **Emmamectin Benzoate** with **Acetamiprid** (coded *Blast Super*

by Sincrop Zimbabwe and *Super Dash* by TSA). Both these are not registered in Zimbabwe or South Africa. Verification trials will be done to collect supporting data.

Insecticides with potential to control Fall Armyworm in Zimbabwe

Insecticides listed in Table 2 have been registered in South Africa for the control of fall armyworm. In Zimbabwe, they are registered for use on other crops for control of other pests, including *Spodoptera* spp., with the **exception of fall armyworm**. Although they have not been scientifically evaluated against the fall armyworm in the country, farmers have used some of them and obtained favourable results. These have been logged for sequential verification work.

Table 2: Insecticides Registered for control of other pests in Zimbabwe

Active Ingredient	Trade Name	Companies
Indoxacarb	Steward 150EC	Polachem
	Missile 150SC	TSA/Acol
	Devacarb 150SC	Seed Chain
	Blanket 150SC	Pivotal
	Indoxacarb 150SC	Refiloe
Indoxacarb and Acetamiprid	Attitude 80SC	Sincrop Zimbabwe
Indoxacarb and Acetamiprid	Aryna 46EC	Polachem
Methomyl	Methomyl, Lannate 90 SP and 90 WP	Citchem, Agricura, TSA, CP Chemicals, Adama, Curechem, Windmill, Ferchochem, Cropserve, Curechem, Nova Agro, Benwik, Capital Agriculture
Chlorantraniliprole	Coragen 20 SC	Polachem
Chlorantraniliprole and Lambda Cyhalothrin	Ampligo 150ZC	Syngenta
Flubendiamide and Thiacloprid	Belt Expert	Bayer
Chlorpyrifos	Chlorpyrifos 48EC, Pyrinex 40EC, Dursban 48EC	Ferchochem, Citchem, Windmill, Nova Agro, Agroshape, Cropserve, Capital Agriculture, ZFC, TSA, IETC, Adama Zimbabwe, Agricura, CP Chemicals, Ecomark

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