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Monitoring of Selective Pest Fall Armyworm (Spodoptera Frugiperda),Corn Earworm (Helicoverpa Armigera), Corn Leafhopper (Dalbulus Maidis) Occurence in The Maize Crop (Zea Mays).

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Abstract - Maize (Zea mays L.) is one of the most important cereal crops cultivated worldwide for food, feed, and industrial purposes. However, its production is significantly affected by various insect pests at different growth stages. Major pests of maize include the Fall armyworm, Corn earworm, corn leafhopper, stem borers such as leafhoppers. These pests cause damage by feeding on leaves, stems, tassels, and ears, leading to reduced yield and poor grain quality.

Keywords - Pest of maize (zea maize).

INTRODUCTION

Maize are mostly rice food after flow and eventually feed, as the needs of raw materials and handicrafts industry. The demand for maize to feed have added value that is higher than soybean. The need for the availability of maize rises annually followed with an increase in the volume of production in Indonesia. Based on statistical data directorate general of food crops agriculture ministry Indonesia for the year 2014-2016 Even production of maize Indonesia in 2017, able to press the import value to zero percent, and the year 2018 have export 372.000 tons.

In an effort to improve of the quality and productivity maize technique cultivation, management, care, handling organisms a bully plants and handling harvesting and after harvest is getting into the main concern. The development of a major pest and disease it has long attacked of maize cultivated by farmers.

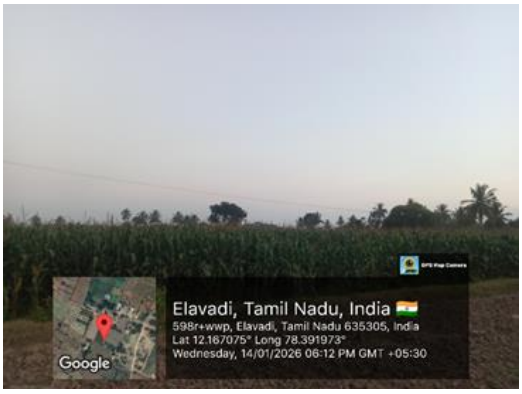
To address the problem of pest and disease that attack maize should be the main concern with regard to the symptoms of an attack to control to be made. Pest and disease primary control attack of maize crop and continue to undergo development in line with developments in technological progress. Control strategy in reducing the development of the population of pests and diseases the maize is done either biologically, the culture of engineering and the use of insecticides and fungicides. The paper is aimed at ascertaining of pest and major diseases that strike at several centers production of maize in Indonesia. This paper aims to know pest and disease of the maize and strategic control.

Lepidopteran pest, is a native of tropical and subtropical regions of the Americans (Nagoshi et al. 2012; early et al.2018). On arrival in Aferica , this invasive pest was first noticed in some west African countries (Benin, Nigeria, and Togo) in 2016 (Abrahams et al 2017; FAO 2018.)

II. MATERIALS AND METHODS

Hand picking – cultural methods

Study Area



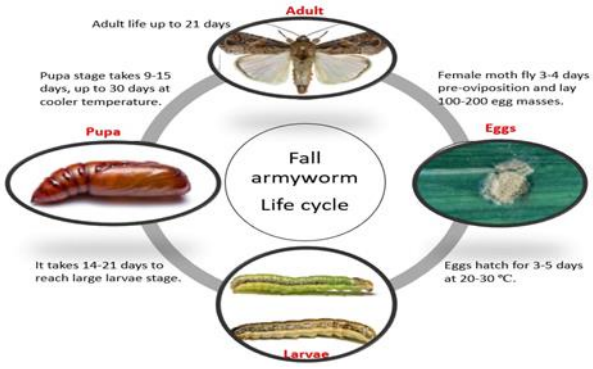
- Elavadai is a village situated 6 kilometres from morappur west
- Elavadai is governed by the kosapatty gram Panchayat and is situated approximately 6 kilometres from the nearest town, kambainallur.
- Dharmapuri is a major horticultural and agricultural belt where nearly 74% of the workforce depends on agriculture. Maize is one of the predominant crops, cultivated in approximately 6,500 hectares across the district.

Name of the maize variety

Name : zea mays
Family : poaceae
Subfamily : ponicoideae
Measurement area
One acre

Pest Details and Theire life Cycle

Fall armyworm (spodoptera frugiperda)



Source and citation: https://csisa.org

Table 1 : November to January

Species name	November	December	January
Fall armyworm (Spodoptera frugiperda)	90%	30%	50%

Fall Armyworm
Figure 1: November to January

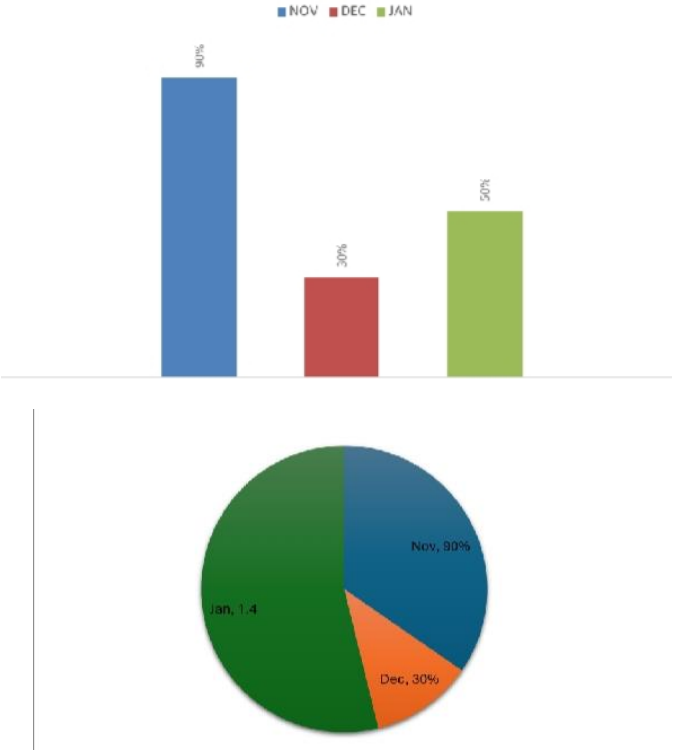


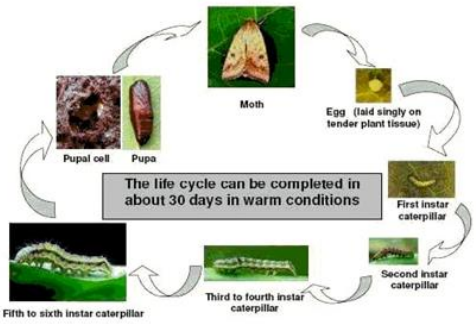
Figure 2: November to January

Egg

- Female moths lay 100-200 eggs in masses, usually on the underside of leaves, covering them with a cream – coloured , hair – like scale for protection
- Hatching occurs in 3-4 days in warm weather
- Larva
- This is the most damaging stage with 6 instars (growth stages)
- Young larva (instars 1-3) feed superficially scraping leaf tissue creating semi – transparent patches
- Older larvae (instar 4-6) move to the leaf whorls (the center) and feed heavily causing large, ragged holes and significant defoliation
- They can also bore into developing lobes to feed on kernels
- Larval stage lasts about 14-30 days depending on temperature
- Pupa
- The mature larva drops to the ground and pupates in the soil in cocoon of soil and silk
- This stage lasts about 7-10 days
- Adult (moth)
- Adult moths emerge from the pupae are nocturnal, and mate
- Adult live for about 7-21 days and are responsible for laying eggs, starting the cycle a new

Corn earworm (helicopter armigern)

Life cycle



Source and citation: https://doi.org

Table 2: November to January

Species name	November	December	January
Corn earworm (Helicoverpa armigera)	40%	20%	10%

Corn Earworm

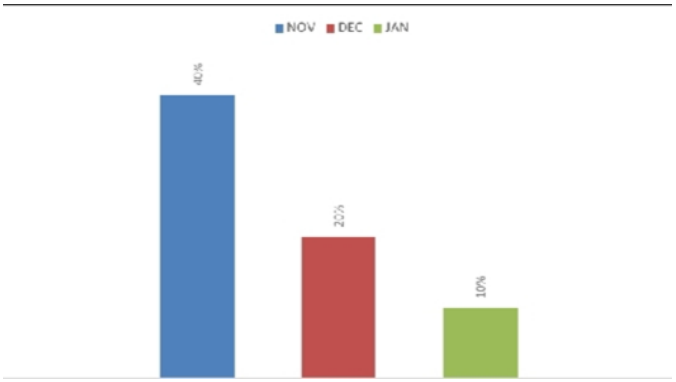


Figure 3: November to January

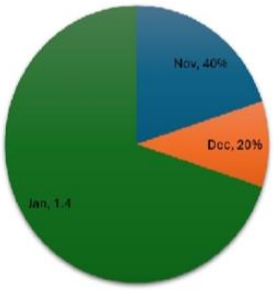


Figure 4: November to January

Egg stage

- Adult moths lay single, small (about 0.5mm) creamy white dome – shaped eggs with ridges, primarily on fresh corn silks but also on foliage
- A single female can lay between 500 and 3,000 eggs in her lifetime
- The eggs turn dark grey or develop a reddish-brown ring before hatching in 2 to 10 days, depending on temperature
- Larval stage
- Upon hatching the young larvae are pale with a black head and immediately move down the silk channels into the ear tip to feed on the developing kernels
- Larvae go through five to six instars(moths) over a period of two to three weeks
- They are highly variable in color, ranging from green, brown, pink, to yellow, with alternating light and dark longitudinal stripes and a light brown or orange head capsule
- A key features is the presence of short stiff, black hairs (microspines) on the body which gives them a rough feel
- Larva are cannibalistic , so typically only one mature larva is found per ear of corn
- When fully grown (about 35 mm long) the larva chews an exit hole through the husk
- Pupal stage
- The full- grown larva drops from the plant and burrows 2 to 4 inches (5- 10 cm) into the soil, where it creates a pupal chamber
- In then transforms into a shiny mahogany-brown pupa, about 18 mm in length
- The pupal stage lasts for about 10 to 25 days during the summer
- In colder climates, the pupae can overwinter in the soil (diapause) and emerge as moths the following spring
- Adult stage
- Adult moths emerge from the soil to mate and lay eggs for the next generation
- Adult have a wing span of 32 to 45 mm and are typically yellowish – brown or olive – green with a characteristic dark spot in the center of a forewings and a dark band on the hindwing
- They are primarily noctural and live for about two to three weeks
- Moths can migrate long distances contributing to the spread of the pest
- Corn leafhopper (dalbulus maidis)

Life cycle

Source and citation: https://www.gardenia

Table 3: November to January

Species name	November	December	January
Corn leafhopper (Dalbulus maidis)	80%	50%	30%

Corn Leafhopper

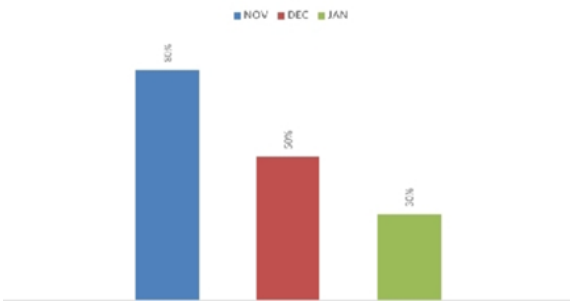


Figure 5: November to January

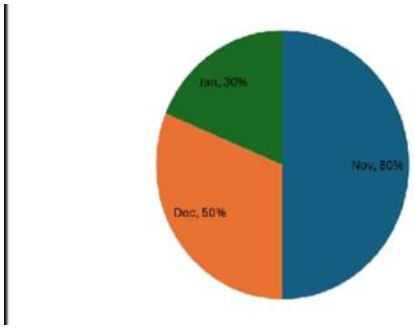


Figure 6: November to January

Egg stage

- Adult female leafhopper use their specialized ovipositer to insert tiny (about 1 mm long) nearly colourless, oval eggs into the tender tissue of the maize leaf often along the midvein within the whorl of young seedlings
- This location makes the eggs difficult to spot with the naked eye
- The incubation period typically lasts for about 4 to 10 days, but can be up to 14 days in cooler temperatures
- Nymph stage
- The eggs hatch into wingless nymphs that are pale yellow to green in colour
- Nymphs remain primarily on the underside of the leaves or inside the corn whorl, feeding on plant sap (phloem and xylem)
- They go through five increasingly layer development stages, known as instars, before maturing into adults
- This nymphal development phase typically lasts around two weeks (14 to 16 days) under optimal conditions
- Adult stage
- The adult leafhopper are light tan or pale yellow and about 1/8 inches (3.7 to 4.3 mm) long. A key distinguishing feature is the presence of two dark spots located between their eyes
- Adults are highly active, can fly rapidly, and move between plants and fields . Female can live for about a month while male may live longer, sometimes up to 80 days adult female can lay an average of 15 eggs per day, with total fecundity reaching several hundred eggs over this lifespan

Pesticides Details

Kakuna

- Lepidopteran pest – caterpillar , borers
- Stops instant damage for crop
- Control for long duration reduce the frequency of application

Chemical Composition

- Navaluron 5.25%
- Emamection Benzoate 0.9%

Horch Herbicide Adama

- Control weeds
- Broad spectrum of grassy and broad leaf weeds

Chemical Composition

- Mesotrine 2.27%
- Atrazine 22.7%

Dhanuka Em-1

- It is a powerful, broud-spectrum insecticide and acaricide designed
- Control caterpillar, borers,and thrips in crops like cotton, chili and vegetables

Chemicals Composition

Benzoate 5%

Result

- In our study we have taken three pest Fall armyworm (spodoptera frugiperda), corn earworm (Helicoverpa armigera), corn leafhopper (Dalbulus maidis) which has been carried out in the our Agricultural land
- Among the three I found Fall armyworm (spodoptera frugiperda) has the majority pest corn earworm (Helicopter armigera), corn leafhopper (Dalbulus maidis)
- Among the three pest Fall armyworm is the higher in population other two
- Occurrence of the selected pest Fall armyworm (spodoptera frugiperda) , corn earworm (Helicoverpa armigera) , corn leafhopper (Dalbulus maidis) by the cultural method of cleaning by the eradication is difficult to culture. Hence we had Adminsted the pesticide (kakuna).

Table 4: three months November to January

Species name	November	December	January
Fall armyworm (Spodoptera frugiperda)	90%	30%	50%
Corn earworm (Helicoverpa armigera)	40%	20%	10%
Corn leafhopper (Dalbulus maidis)	80%	50%	30%

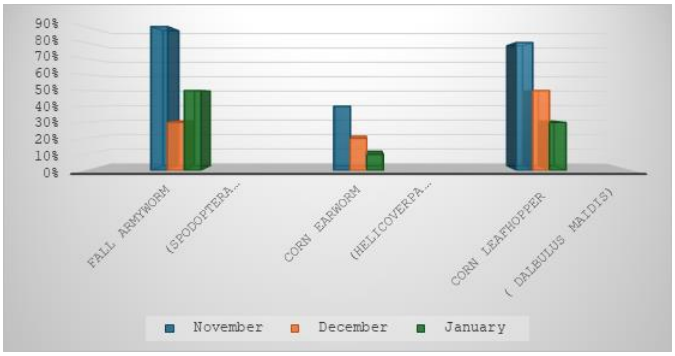


Figure 7: three months November to January

Discussion

- Major pest including three pest Fall armyworm (spodoptera frugiperda), corn earworm (Helicoverpa armigera), corn leafhopper (Dalbulus maidis), and major threats causing nearly 15% of the yield lost due to feeding on leaves, shoots and stem and attacking cobs. These are very highly distractive during the early growth stages
- Pests cause damage by feeding on leaf-reducing photosynthesis . Tunneling through stalks-causing nutrient blockage and these things will include the damage by eating also.
- Pest management can be of three types cultural-early showing , avoiding stragle planting and removing in fested strubble through biological control utilizing enemysenemy's for the maize pest.(eg: Trichocma species and Bacillus thuringiensis) targeted and need based application of insects, pesticides, Herbicides, fungicides when economic threshold level (ETL).
- The pest or polyphagous and devastates the chalange in maize production are dynamic different various local of form house which is considered environment, effective,cheep the indigenous knowledge farmer, which received, is also the basics of problem solving strategy for local poor and underutilized resources communities and scientific knowledge development.

III. CONCLUSION

The monitoring of selective pests—Fall Armyworm (Spodoptera frugiperda), Corn Earworm (Helicoverpa armigera), and Corn Leafhopper (Dalbulus maidis)—in maize (Zea mays) fields highlights their significant impact on crop growth, yield, and overall productivity.

The presence of Spodoptera frugiperda was most pronounced during the vegetative stage, causing severe leaf defoliation and whorl damage. Helicoverpa armigera infestation was observed mainly during the reproductive stage, particularly affecting tassels and ears, leading to direct grain loss. Meanwhile, Dalbulus maidis was consistently recorded throughout the crop cycle, posing a dual threat through direct feeding damage and transmission of maize pathogens.

Population fluctuations of these pests were influenced by environmental factors such as temperature, humidity, and rainfall patterns. Regular field scouting and pheromone trapping proved effective in early detection and timely management decisions.

Overall, the study emphasizes the importance of continuous pest surveillance and the adoption of Integrated Pest Management (IPM) strategies, including cultural, biological, and chemical control measures. Effective monitoring enables early intervention, reduces economic losses, and supports sustainable maize production.

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