



## Scouting or Sampling for Fall Armyworm in Maize Fields

### Scouting objectives

A FAW field scouting programme generally has six objectives:

1. To determine pest presence.
2. To determine incidence of infested plants.
3. To determine numbers of the pest's life stages (eggs and larvae) per sampling unit (plant or defined area of the field).
4. To determine crop damage levels (usually defined in terms of a visual score).
5. To obtain information on other pests damaging the crop alongside FAW and which may need to be managed as well.
6. To determine the effectiveness of a control measure applied previously.

Data from (2)-(4) are used to determine the **action threshold**, i.e., *the pest density or level of damage at which control measures need to be taken*. The FAW IPM Guide for Africa<sup>1</sup> gives smallholder farmer action thresholds<sup>2</sup> for FAW of 20% (range 10-30%) and 40% (range 30-50%) at early whorl stage (emergence to about 2½ weeks after emergence) and late whorl stage (from about 3 weeks after emergence to tasseling), respectively. However, the stage of growth of crop and an individual farmer's perception of potential losses dictate the action threshold that is eventually chosen.

### Scouting or sampling patterns

Although researchers use standardised pest scouting/sampling protocols in a field, it may be unrealistic to expect farmers and extension workers to follow such protocols when their main objective will usually be to check for pest presence and if control is warranted. Rather than prescribe a sampling pattern to farmers and extension workers, what is more important is to emphasize the need to base their inferences on plants sampled from as many points as possible distributed over the entire field.

#### (a) 'Zigzag' pattern

Plants are selected at several points along line transects which meander through the field in a zigzag manner (Fig. 1). This sampling pattern is usually used in extensive surveys where individual fields rather than plots within the same field constitute the replicates. Thus, from each sampling point only one plant is selected. The number of plants and the distance between any two sampling points will depend on the size of the field. With such a sampling pattern, the aim will be to cover as much of the field as possible without making any assumptions on the spatial distribution of infested plants/pest in the field.

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<sup>1</sup> Prasanna, B.M., Huesing, J.E., Eddy, R. & Peschke, V.M. (eds.). *Fall Armyworm in Africa: A Guide for Integrated Pest Management*, 1<sup>st</sup> ed. Mexico, CDMX: CIMMYT.

<sup>2</sup> Based on incidence of plants showing fresh FAW damage symptoms

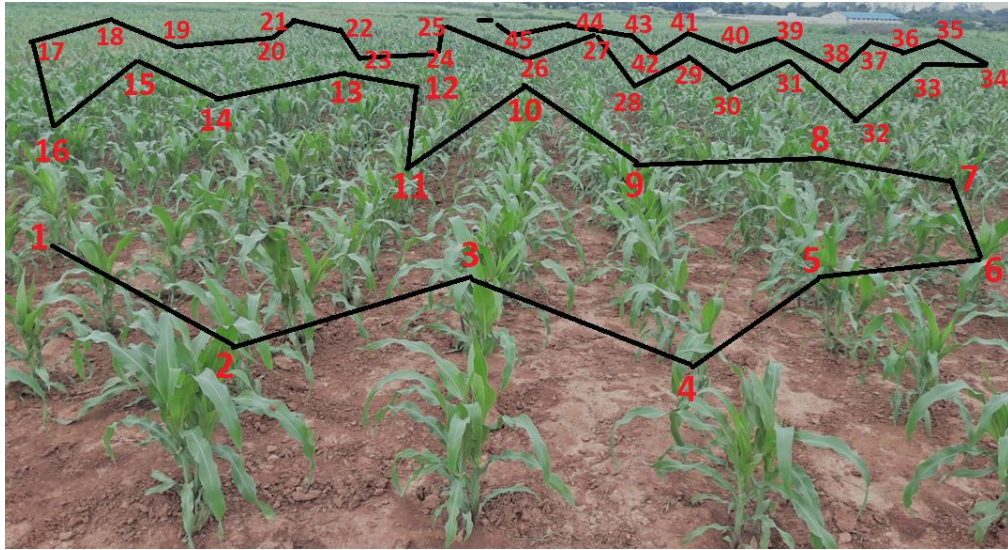


Figure 1. Illustration of zig-zag pattern of sampling in a maize field (sample size = 45+ plants)

(b) 'W' pattern

This sampling pattern is used when plots within one field are used as replicates. Plants are sampled from five points which form the letter 'W' when joined together by four straight lines (Fig. 2). Unlike the zig-zag pattern, several plants (e.g., 20), are selected at each point. The distances between any two sampling points are determined by the size of the field.

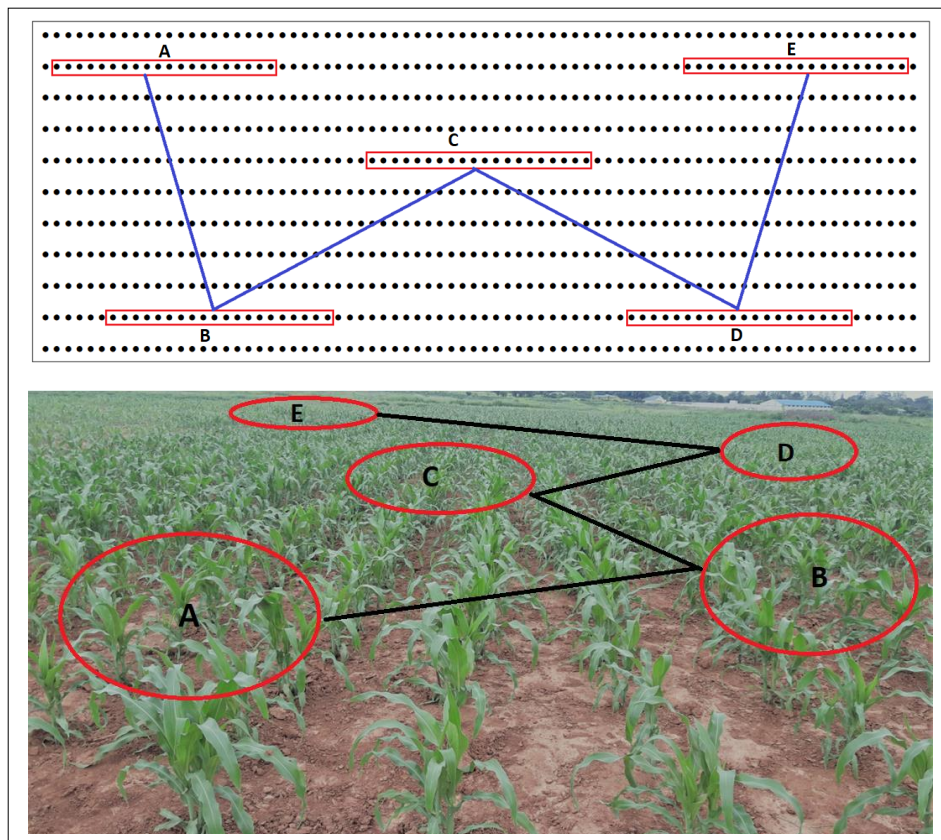


Figure 2. Illustration of a 'W' sampling pattern where several plants are selected at each of five sampling points (A-E) in a maize field

(c) 'Ladder' pattern

Plants are selected along alternating rows which are at right angles to the direction of travel through the centre of the field (Fig. 3). A sampling point may consist of 1 or 2 short rows from which consecutive plants are selected before moving to the next sampling point (analogous to “rungs” of a ladder). A total of 20 plants should be selected at each sampling point. This pattern is well suited to fields which are long and narrow. It is also the most ideal to use at later growth stages of maize (e.g., from tasseling onwards) when traversing across rows of tall and closely packed plants (which may be shedding pollen) becomes difficult.

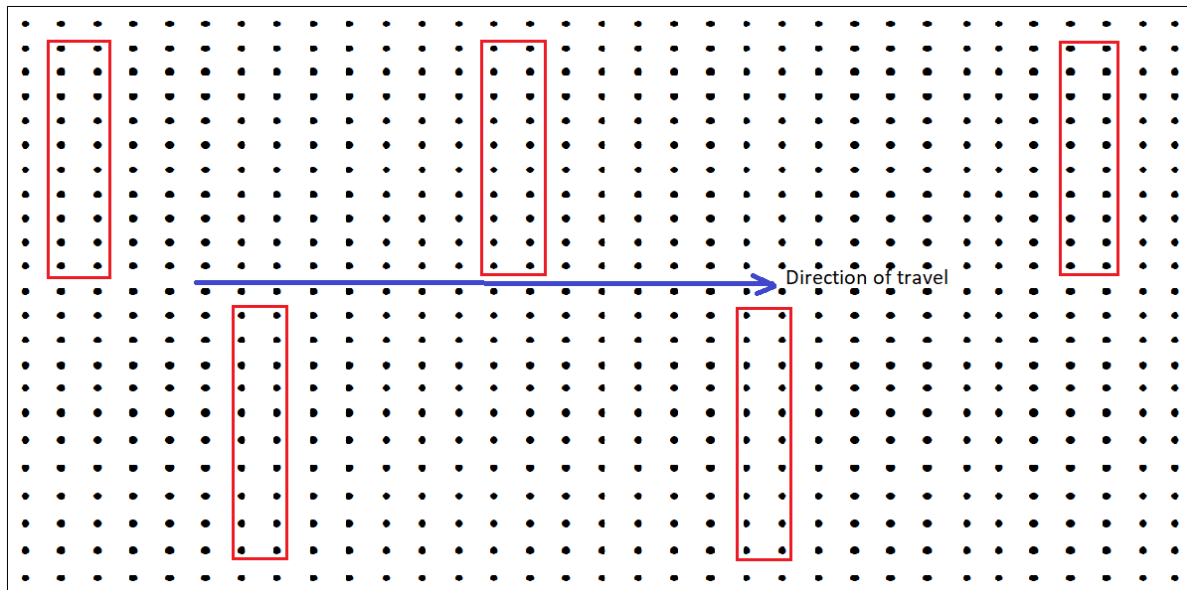


Figure 3. Illustration of a 'ladder' sampling pattern

### Further Reading

- Chinwada, P. 2021. Identification of Fall Armyworm and Confounding Pests in Maize Agroecosystems: An Illustrated Guide. Fall Armyworm IPM Guide No. 1. International Institute of Tropical Agriculture. Oyo Road PMB 5320 Ibadan, Oyo State, Nigeria. Technologies for African Agricultural Transformation. 25 pp.
- Davis, F.M., Ng, S.S. & Williams W.P. 1992. Visual rating scales for screening whorl-stage corn for resistance to Fall Armyworm. Technical Bulletin 186, Mississippi Agricultural and Forestry Research Experiment Station, Mississippi State, MS 39762.
- Prasanna, B.M., Huesing, J.E., Eddy, R. & Peschke, V.M. (eds.). *Fall Armyworm in Africa: A Guide for Integrated Pest Management*, 1<sup>st</sup> ed. Mexico, CDMX: CIMMYT.