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Enhancing management of invasive fall armyworm under different tillage and cropping systems in Nigeria

MOBOLADE AKINBULUMA¹, RAHMAN ZUBAIR¹, VICTORIA AYODELE¹, GRACE SOBIJOH¹,
OLAKUNLE AYODELE¹, OLUBISI BAMIFEWE¹, OLUSEUN OLUBODE¹, OLAYEMI DADA¹,
OLAJUMOKE ALABI¹, MIRIAM KARLSSON²

¹University of Ibadan, Crop Protection & Environmental Biology, Nigeria

²Swedish University of Agricultural Sciences, Dept of Ecology, Sweden

Abstract

The fall armyworm (FAW; *Spodoptera frugiperda*), is a voracious agricultural pest which cause extensive damage to maize crops. Agroecology is a friendly approach that has been practised by many farmers, but the suitability of agro-ecological measures for reducing FAW densities is largely unexplored. Therefore, we hypothesised the effect of tillage and cropping systems on larval population and damage by FAW across two different landscapes in Ibadan, Nigeria. A land size (48.6 m by 32.2 m) was divided into six equal experimental units, each containing different tillage and cropping systems, namely: maize-celosia intercrop+conventional tillage (AICT), maize-celosia intercrop+minimum tillage-mulch (AIMTM), maize-cowpea intercrop+conventional tillage (CPCT), maize-cowpea intercrop+minimum tillage-mulch (CPMTM), Maize-monocrop+conventional tillage (NICT) and maize-monocrop+minimum tillage-mulch (NIMTM). The set up was replicated in two different landscapes representing areas of high tree cover (HTC) and low tree cover (LTC), with each area, having eight replicated farms. Tillage operations and mulching were carried out based on local practices and maize, cowpea and vegetable seeds were sown following standard procedures. Data on FAW larval population were collected by counting the number of FAW on ‘W’ point in the core plot (5 m by 5 m area), while data on foliar damage were taken using the CIMMYT pictorial guide, 1–9 (where 1 = not infested; 9 = heavily infested), at three, six and nine weeks after sowing (WAS). Data were analysed using analysis of variance and means were separated with Duncan’s Multiple Range Test at 5 % probability level. The NICT plot had the highest number of FAW larvae in both the HTC and LTC and FAW larval population was significantly ($p < 0.05$) lower on minimum tillage-mulch plot than in conventional tillage plot. Foliar damage by FAW was significantly lower in HTC area than in the LTC area. It is apparent from the current study that FAW larval population and foliar damage were reduced on minimum tillage and mulching plot than conventional tillage plot as well as on maize monocrop plot than intercropped plot. The effect of high tree cover was stronger than the low tree cover in reducing fall armyworm larval population in Nigeria.

Keywords: Fall armyworm larval , high tree cover, intercropping, minimum-mulch tillage, monocropping