Entomology

Efficiency of a Pheromone-baited Trap for the Sorghum Stem Borer, *Busseola fusca*

D Dakouo[1,*] and A Ratnadass[2,3] (1. INERA, Station de Farako-ba, BP 910, Bobo-Dioulasso, Burkina Faso; 2. ICRISAT-CIRAD, BP320, Bamako, Mali. 3. CIRAD-CA, Programme CALIM, TA73/09,34398 Montpellier Cedex 5, France)

*Corresponding author: ddakouo@fasonet.bf

Introduction

Sorghum [*Sorghum bicolor* (L.) Moench] is the main cereal crop in Burkina Faso with mean annual cultivated area and grain production of 1.3 million ha and 0.943 million tons, respectively (FAO 1999). The crop is subject to various abiotic and biotic constraints. Among the latter, insect pests are of major importance. They mainly belong to two groups: lepidopterous stem borers *[Busseola fusca* (Fuller), *Sesamia calamistis* (Hampson), *Coniesta ignefusalis* (Hampson), *Eldana saccharinal* (Walker) and *Chilo diffusilineus* (de Joannis)] and panicle-feeding insects | sorghum midge (*Stenodiplosis sorghicola* Coquillett) and head bugs (particulary *Eurystylus oldi* Poppius)] (Dakouo and Lankoande 1992). Yield losses due to stem borers range from 16 to 32% under research station conditions in the absence of protection measures (Dakouo and Lankoande 1992). Earlier studies carried out by Dakouo and Ratnadass (1997) revealed that *B. fusca* was the dominant species at Farako-ba research station, near Bobo-Dioulasso in the southwestern part of Burkina Faso. Dakouo and Ratnadass (1997) developed for *B. fusca* a monitoring method based on a pheromone-baited trap, which was found effective on research station. The trapping system was subsequently tested in farmers' fields during two consecutive wet seasons in 1998 and 1999 to monitor the distribution and importance of the pest both on research station and in farmers' fields. The present paper reports the main results obtained.

Materials and Methods

Pheromone trap materials. The trap design was chosen according to previous studies (Youm and Beevor 1995; Dakouo and Ratnadass 1997). It consisted of an aluminium tray (35.5-cm diameter) filled to a depth of 2 cm with water to which a few drops of liquid detergent had been added. The tray was supported 0.5 m above ground level. A shade consisting of a second aluminium tray (26.5-cm diameter) was suspended 5 cm above the larger tray from a horizontal wooden support; both trays were secured with wires. A polythene vial dispenser containing the synthetic pheromone blend of *B. fusca* (commercially available from AgriSense-BCS, UK) was suspended from the underside of the shade on small wire.

Experimental design and trapping method. There were seven trapping sites during the two years. Six sites were located in farmers' sorghum fields at Darsalamy, Sisalia, Samangan, Bankeledaga, Sakaby, and Tondogosso, all within a radius of 5 to 25 km from the site located on the Farako-ba research station.

Moth catches were sorted, removed, and recorded daily at the research station, and three times a week in farmer's fields (in the latter sites by the farmers who had been trained prior to the experiment). Pheromone traps operated from May to December corresponding to the wet season. Pheromone dispensers were replaced every month.

Results and Discussion

Catches were observed from the 26* to the 48* conventional weeks with two distinct peaks of moth flights in both years (Fig. 1). The first peak was observed between the 29th and the 35th conventional weeks. The second peak, which was larger, occurred during the 42nd week in 1998, and the 41st week in 1999. No moths were trapped after the 48th conventional week during either year. The number of moths caught per location ranged from 341 to 817 in 1998 and from 195 to 541 in 1999 (Table 1). The total number of moths caught all locations was 4108 in 1998 and 2389 in 1999 (Table 1).

The results confirmed the efficiency of the pheromone-baited trap in monitoring adult population of *B. fusca* both on-station and in farmers' fields. These promising

Table 1. Average and total number of male *Busseola fusca* moths caught in pheromone-baited traps as function of conventional weeks and years, Burkina Faso, 1998-99.

	Locations							Total number of moths caught per year
Year	Farako-ba	Darsamalamy	Sisalia	Samangan	Banakeledaga	Sakaby	Tondogosso	
1998	605	629	817	571	341	509	636	4108
1999	455	541	389	363	195	246	200	2389

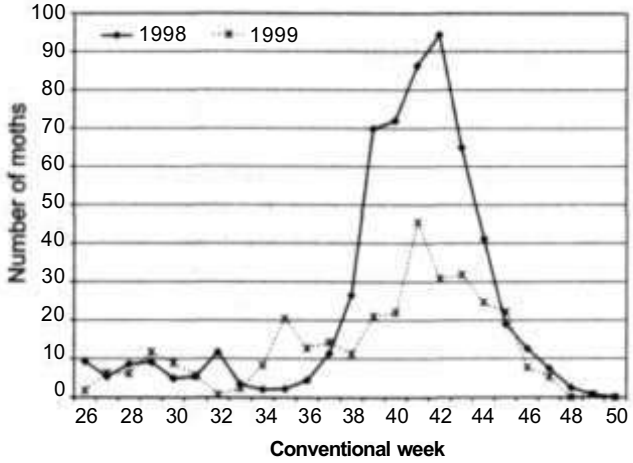

Figure 1. Males of *Busseola fusca* caught in pheromone-baited traps as a function of weeks and years, Burkina Faso, 1998 and 1999.

results could be used in the development of an IPM strategy for the control of stem borers by a better timing of insecticide application. Alternatively, there is prospect for use of *B. fusca* pheromone in mating disruption as promising results were reported by Critchley et al. (1997) from Kenya. Further investigations are needed.

Acknowledgment. This study was supported by the European Union funded project INCO-DC-18-CT96-0106. The authors thank Zongo Adama, Sanou Jean and Sanou Boureima for technical assistance in handling the trapping experiment.

References

Critchley BR, Hall DR, Farman DI, McVeight IJ, Mulaa MAOA and Kalama P. 1997. Monitoring and mating disruption of the maize stalk borer, *Busseola fusca,* in Kenya with pheromones. Crop Protection 16:541-548.

Dakouo D and Lankoande A. 1992. Les lepidopteres foreurs des tiges du sorgho: fluctuations saisonnieres, importance 6conomique et perspectives de lutte integree. Sahel PV Info 42:16-22.

Dakouo D and Ratnadass A. 1997. Bioecology of sorghum stem borers in West Africa and prospects for integrated pest management. Page 43 *in* Insects in African Economy and Environment: Proceedings of the Joint Congress of the Entomological Society of Southern Africa (11th Congress) and the African Association of Insect Scientists (12th Congress) (Roberston HG, ed.). 30 Jun-4 Jul 1997, Stellenbosch, South Africa.

Food and Agriculture Organization of the United Nations (FAO). 1999. Trimestrial Bulletin of Statistics, Vol. 121/2. Rome, Italy: FAO.

Harris KM and Nwanze KF. 1992. *Busseola fusca* (Fuller), the African maize stalk borer: a handbook of information. Information Bulletin no.33, Patancheru, India: ICRISAT, and Wallingford, UK: CAB International. 92 pp.

Youm O and Beevor PS. 1995. Field evaluation of the pheromone-baited traps for *Coniesta ignefusalis* (Lepidoptera: Pyralidae) in Niger. Journal of Economic Entomology 88:65-69.

Effects of Systemic Seed Treatment Insecticides Imidacloprid and Thiamethoxam on Sorghum Hybrids

ED Brown[1], J Trybom[2], WA Colette[1], RC Thomason[1] and BB Pendleton[1,*] (1. Division of Agriculture, West Texas A&M University, Canyon, TX 79016, USA; 2. Pioneer Hi-Bred International, Inc., Sorghum Research Station, Plainview, TX 79072, USA)
*Corresponding author: bpendleton@mail.wtamu.ed

Introduction

Greenbug [Schizaphis *graminum* (Rondani)] has been a major insect pest of sorghum [*Sorghum bicolor* (L.) Moench] since 1968 (Harvey and Hackerott 1969). Greenbugs kill seedlings and reduce yield of more mature plants (Cronholm et al. 1998). Management tactics include the use of foliar insecticides and plant resistance. However, greenbugs have developed new biotypes and resistance to insecticides. In addition, environmental and health concerns regarding certain pesticides have eliminated or restricted their use. Recent focus has been on use of systemic, seed-applied insecticides such as Cruiser (thiamethoxam, 50.0% a.i.) and Gaucho (imidacloprid, 40.7% a.i.). Objectives of this research were to assess effects of Cruiser and Gaucho on damage caused by greenbug, sorghum germination, emergence, and yield.

Materials and Methods

Experiments were conducted at Pioneer Hi-Bred International and at the Stokes commercial farm 8 km away near Plainview, Texas. Soil was Pullman clay loam. The sorghum was grown with limited irrigation. Reduced tillage, manual labor, and herbicides were used to control weeds. Seed was sown on 5 May 2000 to yield 173,000 plants per hectare at the Stokes farm. Seed was sown at Pioneer Hi-Bred International on 7 June 2000 to yield 215,000 plants per hectare. Randomized split plots with sorghum hybrids as the main blocks and seed treatments