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THE USE OF ATTRACTANT TRAPS FOR THE ASSESSMENT OF SORGHUM SHOOT-FLY ATHERIGONA SOCCATA RONDANI (MUSCIDAE: DIPTERA) POPULATIONS

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THE USE OF ATTRACTANT TRAPS FOR THE ASSESSMENT OF SORGHUM SHOOT FLY ATHERIGONA SOCCATA RONDANI (MUSCIDAE:DIPTERA) POPULATIONS*

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INTRODUCTION

The sorghum shoot fly, *Atherigona soccata* Rondani (Muscidae: Diptera) is a serious pest in many sorghum growing areas of the world (Reddy & Davies, 1977). Although the severity of damage varies considerably from season to season and year to year, late sown crops are usuallly severely affected. The seasonal distribution of the pest is still imperfectly understood and a distinct need existed for a simple, inexpensive, reliable sampling method for the adults so that objective assessments of populations throughout the year could be obtained. The attractivity of fish meal to *A. soccata* was demonstrated by Starks (1970). He showed that the application of fish meal to sorghum seedlings resulted in a significantly greater percentage of infested sorghum plants in field trials. More efficient selection of sorghum for shoot fly resistance has been obtained through the use of fish meal in screening trials at ICRISAT.

MATERIALS AND METHODS

Square pan galvanized metal traps 24"x24"x[illegible]" with lids as described by Campion (1972) were used to sample for the adult flies. Each trap was baited with 120 gms of fish meal placed in a 3" diameter x 5" metal mesh cylinder, which touched water (20 litres) containing 100 ml of yeast, 15 ml of ammonium sulphide and one hundred gms of detergent powder. The fish meal was changed and yeast, ammonium sulphide and

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detergent powder were added to the water every 3 days. The water was completely changed once in six days. The traps were placed at 20 different sites at ICRISAT for sampling of cropped and grassland areas Flies were collected from the traps each day, sexed and the males identified. Females were preserved until a suitable character for certain identification of *A. soccata* females was available. This has now been detected (Clearwater 1977) and the females are also being identified to species.

RESULTS

In the period 16th October 1976 to 16th October 1977, the number of shoot flies trapped together with the percentage males and females in the total catch is given in Table 1. Data show that the population of shoot flies was low during summer months and increased from July onwards with peaks during August-September and November-December.

Table 1. Total number of shoot flies recovered from 20 attractant traps at ICRISAT together with percentage females and males and percentage of total males identified as *A. soccata*

Month		Total	Females (%)	Males (%)	*A.soccata* (%)
16-31 Oct.	1976	17079	15370 (89.99)	1709 (10.01)	1393 (8.15)
November	"	27131	25301 (93.25)	1830 (6.75)	1615 (5.95)
December	"	47852	43781 (91.49)	4071 (8.51)	3800 (7.94)
January	1977	26864	24815 (92.37)	2049 (7.63)	1891 (7.04)
February	"	10795	10501 (97.28)	294 (2.72)	158 (1.46)
March	"	2880	2616 (90.83)	264 (9.17)	16 (0.56)
April	"	1148	1094 (95.30)	54 (4.70)	5 (0.45)
May	"	668	619 (92.66)	49 (7.34)	8 (1.20)
June	"	1977	1816 (91.86)	161 (8.14)	24 (1.21)
July	"	30546	28108 (92.02)	2438 (7.98)	676 (2.13)
August	"	340707	321275 (94.30)	19432 (5.70)	3099 (0.91)
September	"	113697	106003 (93.23)	7694 (6.77)	1526 (1.34)
1-16 Oct.	"	26025	23743 (91.23)	2282 (8.77)	1736 (6.67)

Of 647,369 shoot flies trapped during the one year period 15,947 were *A. soccata* males, of which some 10,435 were trapped during October-January, the period of the 'rabi' sorghum crop. *A. soccata* catch was low in April and May. Twelve to 20 times as many females as males were trapped. In all, 32 different species of shoot flies in the genera, *Atherigona & Acritochaeta*, 13 of which are as yet undescribed were recovered from traps (Table 11).

Table 11. Species of shoot flies recovered from 20 attractant traps at ICRISAT.

1	*Atherigona approximata* Mall.	
2	"	*atripalpis* Mall.
3	"	*bella* Frey
4	"	*bidens* Henn.
5	"	*eriochloae* Mall.
6	"	*exigua* stein
7	"	*falcata* (Thom.)
8	"	*laeta* Wied.
9	"	*naquii* Stey.
10	"	*oryzae* Mall.
11	"	*pulla* Wied.
12	"	*punctata* Karl
13	"	*reversura* Vill.
14	"	*simplex* (Thom.)
15	"	*soccata* Rond.
16	"	unidentified (11)
1	*Acritochaeta apicemaculata* Henn	
2	"	*distincta* Mall.
3	"	*orientalis* Schiner
4	"	*pallidipes* Mall.
5	"	unidentified (2)

Different traps became productive at different times. The catch of *A. soccata* was high near blocks of growing sorghum. Numbers

of most species increased considerably after the break of the rains (Table III). More males of *A. soccata* were trapped than those of any other species. *A. punctata* males were also well represented, particularly in August and September.

Table III. Numbers of some common *Atherigona* species recovered from 20 attractant traps at ICRISAT over one year.

Month	*soccata*	*punctata*	*bidens*	*falcata*
16-31 October 1976	1393	19	100	34
November "	1615	9	25	15
December "	3800	17	16	8
January 1977	1891	1	-	2
February "	158	-	-	-
March "	16	-	-	2
April "	5	1	-	6
May "	8	-	-	-
June "	24	2	5	1
July "	676	138	73	122
August "	3099	8274	3977	426
September "	1526	3650	885	76
1-16 October 1977	1736	61	124	23

Data from traps in the period May to July 1977, showed that a total of 33,191 *Atherigona* and *Acritochaeta* specimens attracted to 20 traps, 2,648 were males. Of these, 47.4% were males of *Acritochaeta distincta*, which had previously not been found. This species was very seasonal and associated with rotting fruit of the palm, *Borassus flabellifer* L. (Skinner et. al, in press).

DISCUSSION

The use of fish meal and detergent water is a simple and inexpensive reliable means of monitoring the adult shoot fly populations throughout the year and can be used in timing control operations and assessing the probable levels of attack to sorghum. Studies not reported here showed that the fish meal + yeast + ammonium sulphide mixture was the most potent attractant but for most purposes fish meal alone was

adequate. *Atherigona* was the most common genus of fly trapped with the traps and the most commonly taken species was *A. soccata*, followed by *A. punctata*, *A. bidens* and *A. falcata*. The chemicals responsible for the attractivity of fish meal to shoot flies have yet to be identified and if isolated they could possibly be useful in the management and control of the pest.

It is hoped that the use of the attractant traps for a few seasons will lead to more complete understanding of the biology of *A. soccata* and related species of economic importance and that such information will enable a reduction in yield loss in sorghum in semi-arid tropical areas to be achieved.

SUMMARY

The sorghum shoot fly, *Atherigona soccata* Rond. (Muscidae: Diptera) is an economically important pest of sorghum in the semi-arid tropics. The seasonal distribution of the pest is still imperfectly understood and a distinct need existed for a simple and reliable sampling method for the adults so that objective assessments of populations throughout the year could be obtained. To assess shoot fly populations of several species of *Atherigona* and *Acritochaeta* at ICRISAT, Hyderabad, attractant water traps were used at 20 sites and found to be a simple, effective, inexpensive and reliable means of monitoring the adult shoot fly populations. The most potent attractant mixture tried was fish meal + yeast + ammonium sulphide. In a one year period nearly 650,000 flies were trapped, sexed and the males identified in all 32 species, 13 of which are as yet undescribed were recovered from traps. Twelve to 20 times as many females as males were trapped. Population levels fell to extremely low levels in the summer season. *Atherigona soccata* was the most common shoot fly species trapped followed by *A. punctata*, *A. bidens* and *A. falcata*.

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