

Seasonal incidence of insect-pests of cotton in the scarce rainfall zone of Andhra Pradesh

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ABSTRACT : About 20 species of pests infested upland cotton crop in an overlapping manner. Nine species of natural enemies damaged various stages of pests during 1999-01 in Andhra Pradesh. Only five species viz., *Amrasca biguttula biguttula*, *Aphis gossypii*, *Earias* spp., *Helicoverpa armigera*, *Pectinophora gossypiella* and *Bemisia tabaci* attained the status of major pests. In the case of natural enemies, *Coccinella septempunctata*, *Menochilus sexamaculatus*, *Chrysoperla carnea*, *Syrphus serarius*, *Platygomphos dolobratatus* and *Cantheaconidea furcellata* were found to feed on the sucking pests attacking cotton. *Trichogramma chilonis*, *Bracon gelechiaae*, *Apanteles flavipes* and *Apanteles colomani* were found in the ecosystem to lesser extent.

Key words : Cotton, natural enemies, pest complex

Cotton is one of the most important commercial fibre crops of Andhra Pradesh. It covered about 8.0 lakh ha during 2001-02 (Anonymous, 2002). Most of the cotton is grown under rainfed situation. The pests spectrum of the crop is quite complex and about 162 insect-pests have been reported in India. (Sundaramurthy and Chitra, 1992). To fix the priorities for evolving suitable integrated pest management practices, continuous review regarding pest complex of a crop under an agro-climatic condition is necessary (Hegde *et al.*, 2004). Hence, the present studies were conducted to generate information on various harmful insects and non-insects attacking cotton and beneficial insects at vegetative and reproductive phases of the crop.

MATERIALS AND METHODS

Field experiments were conducted during 1999-2000 and 2000-01 at Regional Agricultural Research Station, Nandyal. The crop was observed at weekly interval from the sowing till final picking and observations were recorded from 50 random tagged plants. The insects species were categorized as major, minor and stray pests on the basis of their mean level of infestation throughout the season. Incidence and fluctuation of insect-pest population were influenced by weather factor (Hegde *et al.*, 2004).

RESULTS AND DISCUSSION

It was observed that the cotton crop was

infested with insects (belonging to Lepidoptera, Coleoptera and Hemiptera) and non-insect pests at different stages of crop growth in an overlapping manner in the scarce rainfall zone of Andhra Pradesh (Table 1). Among the various insect species infesting the cotton crop, the activity of serpentine leaf minor (*Lerionomyza trifoli* Burgess) was found in the most early vegetative stage i. e. cotyledonary and 3 to 5 leaves stage. The incidence of leaf minor was recorded for about 2-3 weeks. Among the sucking pests, only jassid crossed the economic threshold levels briefly requiring interventions. While the jassid incidence was noticed from August to November, and its population varied from 0.20 to 2.53 jassids/ three leaves. Significant positive correlation of jassids with rainfall and rainy days was observed. These results are in confirmity with the findings of Simwat and Gill (1992) (Fig. 1). On the other hand, whitefly infestation though appeared early in the season remained low throughout the crop period ranging from 0.10. to 2.00 whiteflies/three leaves. These results are in confirmity with the findings of Kumar and Agarwal (1990), who reported the appearance of jassids from August to November.

The natural enemies, namely, *Coccinella septempunctata*, *Menochilus sexamaculatus*, *Chrysoperla carnea*, *Syrphus serarius*, *Platygomphus dolobratatus* and *Cantheaconidea furcellata* were found to feed on the pests attacking the cotton crop. Pant (1962) and Atwal (1986) have recorded *C. furcellata* as a predator of *Earias* spp. *Trichogramma chilonis*, *Ecphorosis perditinctus*, *Bracon gelechiaae*, *Apanteles flavipes*

Table 1. Population dynamics of key pests of cotton in the scarce rainfall zone of Andhra Pradesh

Scientific name	Order-Family	Period of activity		Crop stage	Status
		Prevalence	Peak incidence		
<i>Lerema nyza trifoli</i> (Burgess)	Diptera-Agronomyzidae	July-August	Early August	Cotyledonary	Minor
<i>Amrasca biguttula biguttula</i> (Ishida)	Hemiptera-Cicadellidae	July-October	Early August	Vegetative	Major
<i>Aphis gossypii</i> (Glover)	Hemiptera-Aphidae	July and October-December	November & December	Reproductive	Major
<i>Thrips tabaci</i> (Lindemann)	Thysanoptera-Thripidae	August-November	Early September	Vegetative	Minor
<i>Bemisia tabaci</i> (Gennadius)	Hemiptera	September-January		Reproductive	Minor
<i>Earlis vitifolia</i> (Fabricius)	Leptoptera-Noctuidae	July-November	Late July	Vegetative and Reproductive	Major
<i>Helicoverpa armigera</i> (Hubner)	Leptoptera-Noctuidae	July-January	Late August to October	Reproductive	Major
<i>Pectinophora gossypiella</i> (Saunders)	Leptoptera-Gelechiidae	November-January	Late November	Reproductive	Major
<i>Dysdercus cingulatus</i> (Fabricius)	Hemiptera-Pyrrhocoridae	Late October-January	Early December	Later stage	Minor
<i>Oxyacrenus laetus</i> (Kirby)	Hemiptera-Lygaeidae	September-December	Late October	Vegetative	Minor
<i>Spodoptera litura</i> (Fabricius)	Leptoptera-Noctuidae	October-December	November	Reproductive	Major
<i>Tetranychus telarius</i> (Linn.)	Acarina-Tetranychidae	Mid August-Late September	Late August & Early September	Vegetative	Minor

Table 2. Natural enemies of cotton pests

Ladybird beetle	<i>Coccinella septempunctata</i> (Linn.)	Coleoptera-Coccinellidae	Early July-December	Vegetative and Reproductive	Potential predator
Green lacewing	<i>Menochilus sexmaculatus</i> (Fab.)	Neuroptera-Chrysopidae	Mid July-November	Vegetative and Reproductive	Potential predator
Syrphid fly	<i>Syrphus serarius</i> (Wiedmann)	Diptera-Syrphidae	August-Early October	Vegetative and Reproductive	Potential predator
Pentatomid bug	<i>Cartheconideia fuscicollata</i> (Wolff)	Hemiptera-Pentatomidae	Late July to November	Vegetative and Reproductive	Minor, larval parasitoid
Trichogramma	<i>Trichogramma chilonis</i>	Hymenoptera-Trichogrammatidae	August-Late November	Reproductive	Minor, larval parasite
Braconids	<i>Bracon gelechiiae</i> (Ashmead)	Hymenoptera-Braconidae	August-November	Reproductive	Minor, larval parasite
Apanteles	<i>Apanteles flavipes</i> (Cameron)	Hymenoptera-Braconidae	August-November	Reproductive	Minor, larval parasite
	<i>Apanteles colomani</i>				

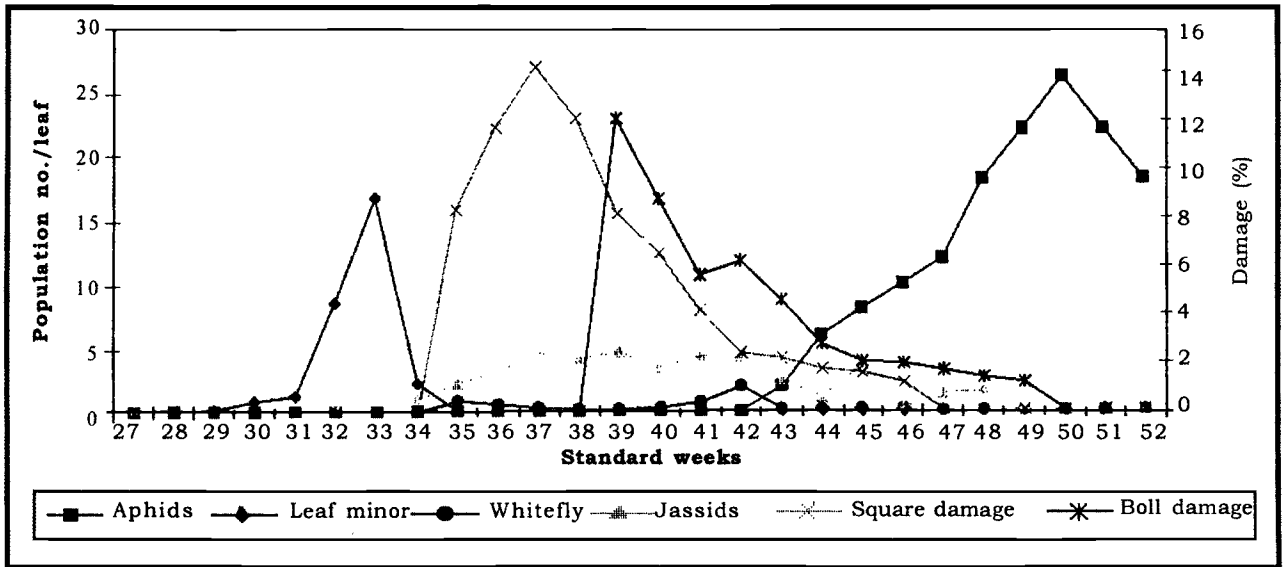


Fig. 1. Population dynamics of key pests of cotton at RARS, Nandyal (1999-2001).

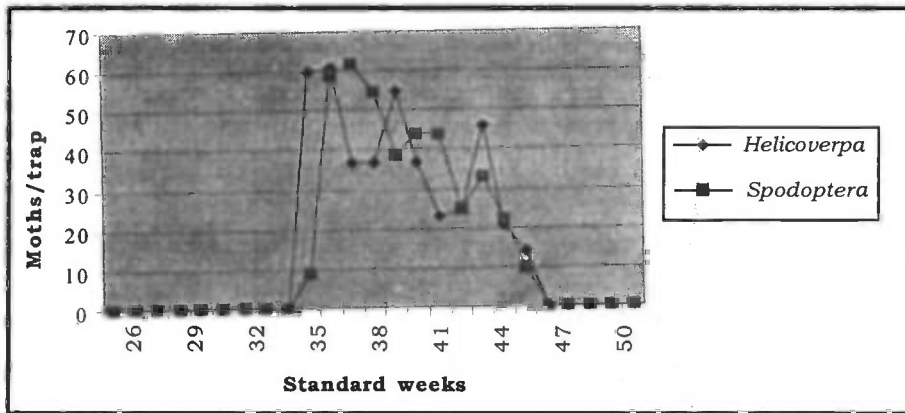


Fig. 2. Pheromone trap catches of *Helicoverpa* and *Spodoptera* population (1999-2000).

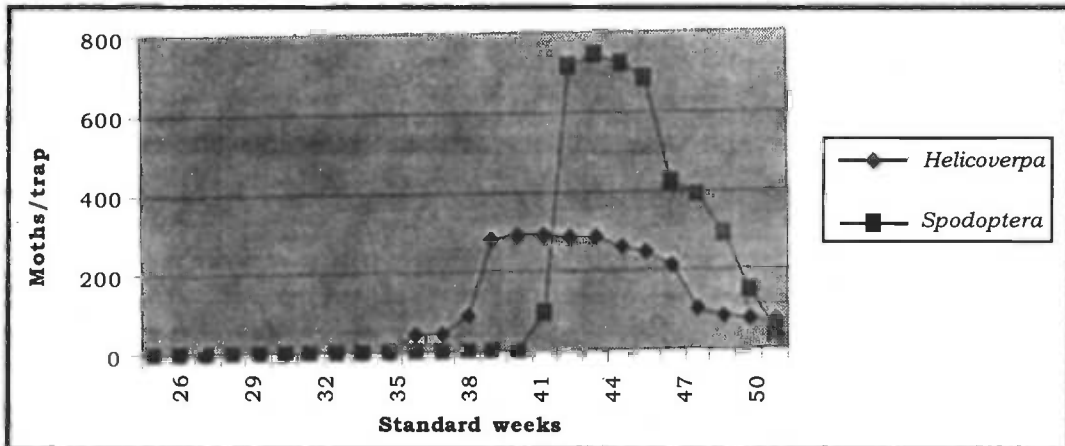


Fig. 3. Pheromone trap catches of *Helicoverpa* and *Spodoptera* population (2000-01).

Table 3. Population dynamics of key pests of cotton (Average of three years)

Standard meteorological week	Leaf miner	Aphids	Jassids	Thrips	Whitefly
27	0	0	0	0	0
28	0	0	0	0	0
29	0.20	0	0	0	0
30	0.80	0	0	0	0
31	1.20	0	0.17	0	0
32	8.60	0	0.28	0	0
33	16.80	0	0.67	0	0
34	2.20	0	0.53	0	0
35	0	0	1.17	8.44	0.80
36	0	0	1.73	11.82	0.60
37	0	0	2.47	14.36	0.24
38	0	0	2.20	12.20	0.20
39	0	0	2.53	8.26	0.10
40	0	0	1.86	6.62	0.30
41	0	0	2.26	4.20	0.70
42	0	0	2.26	2.48	2.00
43	0	2	1.30	2.20	0.20
44	0	6	0.57	1.80	0.10
45	0	8	2.00	1.60	0.20
46	0	10	0.12	1.20	0.20
47	0	12	0.76	0	0
48	0	18	0.82	0	0
49	0	22	0.20	0	0
50	0	26	0	0	0
51	0	22	0	0	0
52	0	18	0	0	0
1	0	12	0	0	0

Table 4. Pheromone trap catches of American bollworm and *Spodoptera litura*

Standard meteorological week	American bollworm		<i>Spodoptera litura</i>	
	1999-2000	2000-01	1999-2000	2000-01
26	0	0	0	0
27	0	0	0	0
28	0	0	0	0
29	0	0	0	0
30	0	0	0	0
31	0	0	0	0
32	0	0	0	0
33	0	0	0	0
34	0	0	0	0
35	60	0	9	0
36	61	44	59	0
37	37	46	62	0
38	37	92	55	0
39	55	282	39	0
40	37	290	44	0
41	23	292	44	96
42	25	286	25	714
43	46	288	33	740
44	21	260	22	722
45	14	245	10	682
46	0	214	0	424
47	0	106	0	389
48	0	86	0	292
49	0	78	0	149
50	0	70	0	47

and *Apanteles colomani* (Table 2) were found to parasitise host with very less population. Raodeo and Sarkate (1979) reported similar species of natural enemies feeding on various stages of cotton pests.

American bollworm started in the month of September (35th standard week) and remained as insect of concern on cotton crop to the end of November (Figs. 2 and 3). These findings are in line with the observations made by Ali (1992) that *Helicoverpa* was more common from mid to late season (Table 3). Further its population was high in the month of October. Usually October witnessed the cloudy weather and frequent rain. Rao *et al.* (1993) and Jha and Baisen (1994) supported the present findings, who revealed that rainfall favoured the population buildup of *Helicoverpa* (Table 4).

The probable reasons for increase in pests population during both vegetative and reproductive phases might be in part a result from the adaptation of population to cotton as a host and in part from the suppression of natural enemy activity by insecticidal application (Choudhary, 2000).

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