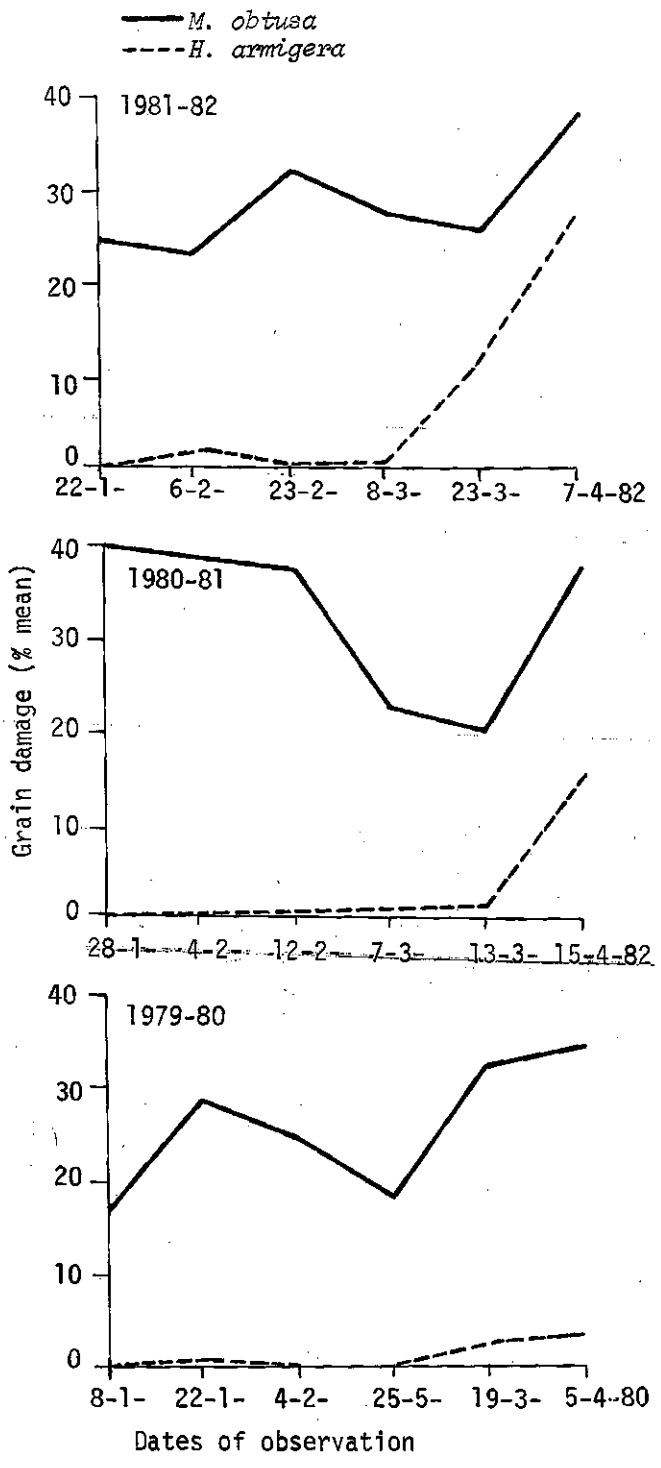

Figure 1. Damage by pod borer and podfly assessed over four months during three years at Kanpur, India.

both *H. armigera* and podfly, which suggests that the productivity of pigeonpeas that mature in November should be studied further.

Reference

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- *C.P. Yadava, S.S. Lal, C.A.R. Dias, and R. Nigam (Project Directorate (Pulses), Kanpur, U.P., India)*

Influence of Pigeonpea Resistance to *Heliothis* on the Natural Parasitism of *Heliothis* Larvae

The pod borer *Heliothis armigera* is a major pest of pigeonpea. At ICRISAT, efforts are under way to identify and utilize pigeonpea cultivars tolerant or resistant to attack by this pest. An integrated approach for managing the pest could involve a combination of the use of a resistant cultivar with other methods of pest control. During the 1981-82 rainy season, we compared the effect of pod borer resistant and susceptible cultivars of pigeonpea on the natural larval parasitism of *H. armigera* at ICRISAT Center.

Three each of 'low borer' (resistant) and 'high borer' (susceptible) cultivars were sown at two plant densities (4.4 and 13.3 plants/m^2) in a four-replicate split plot trial (in 14-row plots of 9 m long) in a pesticide-free Vertisol field. *H. armigera* larvae collected from resistant and susceptible cultivars were examined individually in the laboratory for the incidence of natural parasitism (Table 1).

Table 1. Percent parasitism and numbers of *Heliothis armigera* larvae sampled from resistant and susceptible cultivars of pigeonpea planted at two densities, ICRISAT Center, 1981-82.

	Resistant		Susceptible	
	S1[a]	S2[a]	S1	S2
Larvae/m^2	1.9	1.9	3.4	5.1
No. of larvae sampled	438	522	376	590
Larvae parasitism (%) (among survivors)	32.7	36.7	36.0	47.4
Overall parasitism (%) for the cultivar	34.5		42.5	

[a]S1 = 4.4 plants/m^2; S2 = 13.3 plants/m^2.

There was a greater level of parasitism in the larvae from the susceptible than in those from the resistant cultivars. Also, the greater the plant density, the greater was the level of parasitism (Table 1). We have earlier recorded that there is an increase in the number of *H. armigera* larvae per unit area, with increase in plant density. It is likely that the closed crop canopy and also the greater abundance of host larvae per unit area at the higher plant density may have encouraged the parasite activity. The resistant cultivars may have been less attractive for the parasites because of the reduced abundance of the host larvae, or because of a direct influence of varietal characters (physical or chemical) on the host searching by the parasites. The influence of cultivars was more distinct during October-November when *Carcelia illota* Curran was the dominant parasite, than during January 1982 when another tachinid, *Goniophthalmus halli* Mes., was dominant. It would be useful to study whether crop phenology and/or species difference in the parasites have a role to play in such influence of cultivars on *H. armigera* larval parasitism.

It has been recorded that the quality and quantity of parasitism in *H. armigera* eggs and larvae collected from pigeonpea and other crop hosts differ greatly (Bhatnagar et al. 1981; Sithanantham et al. 1982) but this is apparently the first record of cultivaral differences in pigeonpea influencing the levels of larval parasitism. These results have some importance in developing a pest management strategy which uses a pod borer resistant cultivar as the major component.

The supply of seeds for these studies by Dr. S.S. Lateef of ICRISAT is gratefully acknowledged.

References

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- *S. Sithanantham, V. Rameshwar Rao, and W. Reed (ICRISAT)*

Wasps—Predators of *Heliothis* on Pigeonpea

Heliothis armigera, which is the major pest of pigeonpea in most areas of the Old World, has many natural enemies. At ICRISAT we are exploring the possibilities for increasing the effectiveness of these in reducing the losses caused by this pest. Bhatnagar (1981) recorded that the mud-wasp, *Delta conoideum* (Gmelin), preyed upon *H. armigera*, and that up to 26 larvae could be found in a single group of mud cells.

In 1981-82 we conducted studies of mud wasps in a field cage and in crops in open fields at ICRISAT Center. We recorded that *D. pyriforme* (Fab.) and *D. campaniforme esuriens* (Fab.) as well as *D. conoideum* preyed upon *Heliothis* larvae (Fig.1). *D. campaniforme esuriens* preyed mainly upon 2nd and 3rd instar larvae while the other two species preferred the larger 4th-6th instar larvae. Several other lepidopteran larvae were also collected by these wasps including *Plusia* spp.

We kept the wasps in a field cage (2.5 x 2.0 x 1.5 m) placed on an Alfisol. A small pool of water was provided and *Heliothis* larvae were placed on pigeonpea plants grown in pots inside this cage.

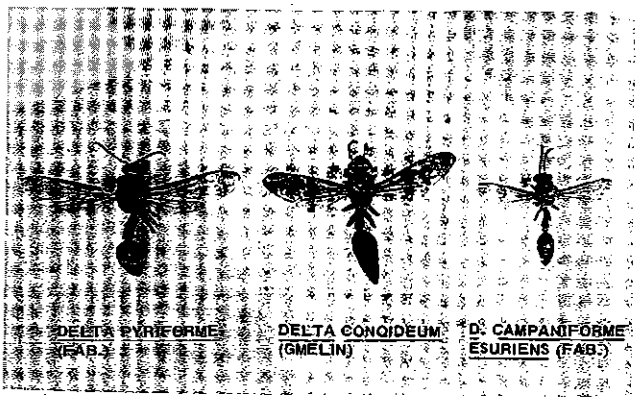

Figure 1. Three species of wasp found to prey on larvae of Heliothis armigera *at ICRISAT Center, Patancheru, India.*