

Short Communication

A record on the insect pests of wild relatives of pigeonpea, mungbean and urdbean

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Integrated approaches are being followed for the management of pests in the present world. One of the components in IPM is the use of host plant resistance, which can be easily adopted by the farmers with a cheaper cost. For the identification and development of resistance sources, wild relatives of different cultivated species are being employed. This kind of approaches are being followed in the legume improvement programme also. One of the major limiting factors in pulse production is the pest complex, which inflicts heavy yield loss. The major legume insect pests are the gram pod borer *Helicoverpa armigera* Hubner, pod fly *Melanagromyza obtusa*, spotted pod borer *Maruca vitrata* Geyer and pod bugs *Clavigralla gibbosa* Spinola, *Riptortus* spp. and blister beetle, *Mylabris* sp. (Durairaj 1999). The gram pod borer is the most devastating pest of pigeonpea, which cause worldwide yield loss of more than \$ 317 million annually (Shanower *et al.* 1999). As there was low level of resistance in cultivated types of pigeonpea, the search for resistance sources has been included on non-cultivated *Cajanus* sp. also (Lateef *et al.* 1981).

In recent years, after the introduction of photo insensitive short duration pigeonpea, some of the minor pests became major. In southern parts of India, the pod fly and the blister beetle *Mylabris* sp. once considered as minor pests attained major pest status (Durairaj 1995, Durairaj and Ganapathy 2000). The sucking insects such as mealy bug, *Coccidohystrix insolitus* Green and scales *Ceroplastodes cajani* Maskell were also reported as major pests in specific locations (Ganapathy *et al.* 1994). Of late, severe incidence of a hymenopteran pest (*Tanaostigmodes cajaniae* La Salle) on pigeonpea pods was also recorded in southern parts of India (Durairaj *et al.* 2003). Similarly, mungbean and urdbean are also considered as important legumes in both southern and northern parts of India. The pest spectrum for the above legumes is almost similar and the major insect pests are aphids *Aphis craccivora*, white fly *Bemisia tabaci*, sucking insect complex *Riptartus* sp., *Clavigralla* sp., and *Nezara viridula* and pod borer complex. In recent days, the stem fly *Ophiomyia phaseoli* Tryon attack in the early stage of the mungbean and urdbean crops is on the increase.

Hence for the management of legume pests, the wild relatives of pigeonpea (*Cajanus cajan*) and mungbean (*Vigna radiata*) are being utilized in the crossing programme to impart resistance to insect pests. The wild relatives of pigeonpea

such as *C. scarabaeoides*, *C. sericeus*, *C. acutifolius* and *Rhynchosia aurea*, have shown high levels of resistance to *H. armigera* under field conditions (Sharma *et al.* 2001). Earlier reports showed *C. reticulatus* as pod fly resistance type (Gaur and Chaturvedi, 2004). For mungbean and urdbean improvement programme, the wild relatives *viz.*, *Vigna umbellata*, *V. sublobata*, *V. glabrescens* and *V. vexillata* are being employed. When any wild relative of cultivated crops are utilized for the development of resistance to a particular pest, it is essential to have on-hand knowledge on the insect pests that are known to occur on the wild relatives. This source of information will be highly useful in preventing the spread/outbreak of the pest that was confined only to the wild relatives at specific locations.

This study was conducted to record the pests of wild relatives of pigeonpea (7 nos.), mungbean and urdbean (4 nos.) that are being maintained at the Department of Pulses, TNAU, Coimbatore during 2003-2005. Periodical observations were made on the wild relatives of pigeonpea, mungbean and urdbean on different insect pests causing damage in different growth phases at monthly intervals. The per cent damage to pods, leaves and stems by different insect groups were also recorded. Pod damage caused by plume moth and pod wasp was graded as negligible (<5%), low (6-10%), moderate (11-20%) and severe (> 21%). The pod fly grain damage was also graded as above. The damage to plant parts by aphids, mealy bug, scales and redspider mite was graded as negligible (<5%), low (6-10%), moderate (11- 20%) and severe (> 21%).

The result showed that among the wild relatives of pigeonpea *viz.*, *Rhynchosia rothii*, *R. minima*, *C. cajanifolius*, *C. albicans* and *C. volubilis*, the major pests observed were the aphids *A. craccivora*, podfly *Melanagromyza obtusa*, and the mealy bug complex *Ferrisia virgata*, *Coccidohystrix insolitus* and the scale *Ceroplastodes cajaniae*. However, *R. rothii*, *R. minima* and *C. cajanifolius* were found to be highly susceptible to aphids with a damage ranging from 30 to 60 per cent, while the pod fly damage was moderate to severe (15 to 70%) in *R. minima*, *R. rothii*, and *C. acutifolius*. The pod wasp *T. cajaniae* damage was observed only in *C. acutifolius* and *C. cajanifolius* with a moderate to severe damage ranging from 25–45 per cent (Table 1). Earlier the incidence of this species was reported from the cross *C. platycarpus* and *C. cajan* (Nalini Mallikarjuna and Shanower 2001). It was also reported that the wild relatives such as *C. platycarpus*,

Table 1. Pests of wild relatives of pigeonpea, mungbean and urdbean (2003-05)

Wild species	Pests observed	Severity	Damage range %
<i>Rhynchosia rothii</i>	<i>Aphis craccivora</i>	Severe	(45-50)
	<i>Melanagromyza obtusa</i>	Severe	(60-70)
	<i>Exelastis atomosa</i>	Negligible	(3-4)
	<i>Ferrisia virgata</i>	Negligible	(1-2)
	<i>Coccidohystrix insolitus</i>	Moderate	(15-20)
<i>R. minima</i>	<i>A. craccivora</i>	Severe	(50-60)
	<i>M. obtusa</i>	Moderate	(15-17)
<i>R. volubilis</i>	<i>F. virgata</i>	Severe	(37-40)
	<i>Ceroplastodes cajaninae</i>	Severe	(25-30)
<i>C. albicans</i>	<i>C. cajaninae</i>	Severe	(25-30)
	<i>C. insolitus</i>	Severe	(40-45)
<i>C. cajanifolius</i>	<i>A. craccivora</i>	Severe	(30-35)
	<i>Tanaostigmodes cajaninae</i>	Severe	(42-45)
<i>C. acutifolius</i>	<i>F. virgata</i>	Stray	(1-2)
	<i>C. cajaninae</i>	Moderate	(25-30)
	<i>T. cajaninae</i>	Moderate	(25-30)
	<i>M. obtusa</i>	Moderate	(30-40)
<i>C. scarabaeoides</i>	<i>F. virgata</i>	Severe	(50-55)
	<i>C. cajaninae</i>	Moderate	(15-20)
<i>Vigna umbellata</i>	<i>Tetranychus urticae</i>	Severe	(60-70)
	<i>A. craccivora</i>	Moderate	(20-30)
	<i>Empoasca sp.</i>	Stray	(1-2 / plant)
	<i>Riptortus sp.</i>	Stray	(1-2 / plant)
<i>V. sublobata</i>	<i>T. urticae</i>	Moderate	(20-30)
	<i>A. craccivora</i>	Low	(5-10)
<i>V. glabrescens</i>	<i>A. craccivora</i>	Low	(5-10)
<i>V. vexillata</i>	<i>A. craccivora</i>	Stray	(1-5)

C. scarabaeoides, *R. aurea*, *C. cajanifolius*, *Flemingia bracteata*, *F. stricta*, *Paracalyx scariosa* and *R. bracteata* were susceptible to both pod fly and pod wasp (Sharma *et al.* 2003). The incidence of other pests such as *Exelastis atomosa* was recorded only on *R. rothii* at a very low level (3-4 %), whereas the incidence of *F. virgata* was noticed with varying levels in different wild types of pigeonpea, mungbean and urdbean.

The leaf damage by the mealy bug *C. insolitus* was found to be moderate (15-20 %) in *R. rothii*. The attack of two tailed mealy bug, *Ferrisia virgata* Cockerell was found in severe form on *C. scarabaeoides* and *R. volubilis*, (37-55 %) and negligible (1-2%) in *R. rothii* and stray incidence in *C. acutifolius*. The scale insect, *C. cajaninae* that confined to stem portion was recorded in severe form (25-30%) in *R. volubilis* and at moderate levels in *C. acutifolius* and *C. scarabaeoides* (15-30%). Severe form of scales and mealy bugs was also recorded from *C. albicans*.

The wild types of mungbean and urdbean *Vigna umbellata*, *V. sublobata*, *V. glabrescens* and *V. vexillata* had

the pest spectrum of *A. craccivora*, red spider mite *Tetranychus urticae*, hoppers *Empoasca* and the pod bug *Riptortus*. However the damage by *T. urticae* and *A. craccivora* was found to be severe (60-70%) and moderate (20-30%), respectively. The damage by other pests such as hoppers and pod bugs was very low. Based on the available information, it is inferred that *Vigna umbellata*, *V. sublobata*, *V. glabrescens* were resistant to *Callasobruchus maculatus* (Kaga and Ishimoto 1998, Srinivasan 2005, Tamooka 1991). But information for their susceptibility to other sucking insects was not available. From this study, it is concluded that the wild types of mungbean and urdbean were found to be infested significantly with sucking insects and red spider mite only.

This study as a whole revealed that almost all the wild types were found to be susceptible to aphids *A. craccivora*. Susceptibility was also noted in severe form for the important pod borers *M. obtusa* and *T. cajaninae* in *R. rothii* and *C. cajanifolius* and *C. acutifolius*. Though other sucking pests *F. virgata*, *C. hystrix* and *C. cajaninae* may not be considered as serious pests, some of the wild types were found to be highly susceptible. These clearly showed that above wild types might be resistant sources for *H. armigera* but are susceptible to other pest complex of legumes. These facts are to be considered while using these wild relatives for the resistance breeding programme.

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