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RANGE AND OCCURRENCE OF PIGEONPEA PESTS IN CENTRAL UGANDA

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ABSTRACT

A study was carried out at the Makerere University Agricultural Research Institute, Kabanyolo over four cropping seasons (1990-1992) to determine the range of pests attacking pigeonpeas (*Cajanus cajan* (L) Millsp.) in Uganda, and to assess their status depending on occurrence and nature of damage. Of the species identified, there were seven lepidopterans, two homopterans, three heteropterans and coleopterans, each, and one dipteran, hymenopteran, isopteran and thysonopteran insects and jassids (Homoptera), cowbugs (Heteroptera), leaf webbers and defoliators (Lepidoptera), leaf beetles (Coleoptera) and grasshoppers (Orthoptera). Seven identified species were new records on the crop in the country. The most commonly occurring species were *Aphis craccivora* (Koch), *Helicoverpa armigera* (Hub), *Maruca testulalis* (Geyer), *Etiella zinckenella* (Treitschke), *Melanagromyza chalcosoma* Spencer, *Tanaostigmodes cajaninae* LaSalle and *Clavigralla* sp.

***Key Words*: Range and occurrence, pigeonpea pests, Uganda.**

RÉSUMÉ

Une étude a été conduite à l'institut de Recherche Agricole de l'Université de Makeré sur 4 saisons consécutives (1990–1992) pour établir la gamme de ravageurs du pois d'Angole (*Cajanus cajan* L. Millsp.) en Ouganda et évaluer leur rôle en fonction de leur présence et de la nature des dégâts. Parmi les espèces identifiées, on a recensé 7 lépidoptères, 2 homoptères et coléoptères, 1 diptère, hymenoptère, isoptère et thysanoptère; les autres espèces collectées mais non identifiées sont des cochenilles, des jassides (Homoptères), des punaises (Heteroptères), des enrouleurs de feuilles et des défoliateurs (Lépidoptères), des coléoptères foliaires et des saut eriaux (Orthoptères). Sept espèces identifiées sont signalées pour la première fois sur cultre dans le pays. Les espèces les plus repandues sont *Aphis cracivora*, *Helicoverpa armigera* (Hub), *Maruca testulalis* (Geyer), *Ethiella zincenella* (Treitschke), *Melanagromyza chalcosoma* Spencer, *Tanaostigmodes cajaninae* LaSalle et *Clavigralla* sp.

***Mots Clés*: Gamme et présence, ravageurs du pois d'Angole, Ouganda**

INTRODUCTION

Pests are some of the major constraints to greater production of pigionpea (*Cajanus cajan* (L) Millsp.) in most regions of the world, and over 200 arthropod species are reported to feed on the crop (Bhosale and Nawale, 1983; Singh and Rai, 1984; Bhalani and Bharodia, 1988; Reed and Latef, 1990). However, due to their low populations and sporadic or localised occurrence, most of the pests that attack pigeonpea are regarded as minor (Reed *et al.*, 1989).

The most important pests of pigeonpea are those that attack flowers and pods, particularly the pod borer complex. This group of pests includes the American bollworm, *Helicoverpa* (*Heliothis*) *armigera* (Hubner), the podfly, *Melanagromyza obtusa* (Malloch), the cowpea pod borer, *Maruca testualis* (Geyer), the legume pod borer, *Etiella zinckenella* (Treitschke), the plume moth, *Exelastis atomosa* (Walsingham), and the blue butterfly, *Lampides boeticus* (L.). Seed-sucking bugs, particularly *Clavigralla* spp., are also important (Bindra and Jokhmola, 1967; Sinha *et al.*, 1979; Mishra and Odak, 1981; Bhadauria *et al.*, 1988; Reed and Lateef, 1990; Armstrong, 1991).

In Uganda, 51 insect species were listed as feeding on the crop (Le Pelley, 1959); 23 of these are hemipterans, 23 lepidopterans, one dipteran, three coleopterans, and one orthopteran. The pest status of these insects have not been clearly investigated. The present study therefore aimed to determine the range of pests attacking pigeonpeea, and to assess their status depending on occurrence.

MATERIALS AND METHODS

This study determined the range of pests attacking pigeonpea in Central Uganda. Experiments were conducted at Makerere University Agricultural Research Institute, Kabanyolo (MUARIK). Studies were carried out over four seasons, covering the short rains (SR) of 1990 and 1991, and long rains (LR) of 1991 and 1992.

Six short-duration (SD) and seven medium-duration (MD) pigeonpea cultivars were grown during the study. All cultivars except the local check were obtained from the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), India. The SD cultivars were ICPL 85010, ICPL 87, ICPL 87104, ICPL 151 88001 and ICPL 87111, and the MD cultivars were ICP 13200, ICP 11377, ICP 11984, ICP 11429, ICP 12748, ICP 12075 and Apio, a local cultivar.

The crops were grown in randomised complete blocks replicated four times. In short rains of 1990, each cultivar was planted in plots measuring 5x1.6 m, in five rows spaced 40 cm apart. In all other seasons 5x2.4 m plots were used, each consisting of five rows spaced 60 cm apart. Within-row spacing was 10 cm in the short rains of 1990, and 30 cm in the subsequent seasons. The spacings were adjusted in order to meet the spacing requirements for the medium-duration cultivars which were introduced in 1991.

Planting dates were March 29 and 28 in the long rains of 1991 and 1992, and October 16 and 11 in the short rains of 1990 and 1991, respectively. Three seeds were planted per hole, and the seedlings thinned to one plant per hole two weeks after emergence. All crops were sprayed with the fungicide Mancozeb (Dithane M-45 80% WP) and hand-weeded regularly.

To establish the range of insect species attacking pigeonpea, field observations were carried out throughout the study period. All pests found feeding on the crop were collected and identified. Some larvae and pupae were collected and reared in plastic vials on appropriate food media (leaves or pods), and the adult stages identified with the aid of a pigeonpea pest identification handbook (Reed *et al.*, 1989).

RESULTS

A diversity of insect pests were found feeding on various parts of the pigeonpea plant. Of the species identified, there were seven lepidopterans, two homopterans, three heteropterans and coleopterans each, and one dipteran, hymenopteran, isopteran and thysanopteran species each (Table 1). Other groups of insects recorded but not fully identified were various scale insects and jassids (Homoptera), cowbugs (Heteroptera), leaf webbers and defoliators (Lepidoptera), leaf beetles (Coleoptera) and grasshoppers (Orthoptera).

While a substantial number of the insects were previously recorded on pigeonpea in Uganda, at

TABLE 1. The range of pests recorded on pigeonpea at Kabanyolo, Uganda, 1990–1992.

Order	Pest species	Status[a]	Reference[b]
Homoptera	*Aphis craccivora* Koch	V; R	*
	Aphis fabae Scopoli	V; R	*
Heteroptera	*Clavigralla* sp.	P/S; C	1
	Nezara viridula (L.)	P/S; C	1
	Riptortus sp.	P/S; R	1
Lepidoptera	*Helicoverpa armigera* (Hubner)	P/P; C	2
	Maruca testulalis (Geyer)	P/P; C	1
	Etiella zinckenella (Treits)	P/S; C	1, 2
	Exelastis atomosa (Wals)	P/S; R	1
	Lampides boeticus (L)	P/P; R	1
	Chrysodeixis chalcites Esper	V; R	*
	Euproctis subnotata	V; R	*
Diptera	*Melanagromyza chalcosoma* Spencer	P/S; C	*
Hymenoptera	*Tanaostigmodes cajaninae* La Salle	P/S; C	*
Coleoptera	*Callosobruchus* sp.	P/S; C	
	Apion sp.	P/S; R	1
	Mylabris sp.	F; R	*
Thysanoptera	*megalurothrips* sp.	F; R	*
Isoptera	*Odontoterms* sp.	V; R	*

[a] V = vegetative pest; F = Flower pest, F/P = Flower/Pod pest; P/S = pod/seed pest; C = common pest; R = Rare pest.
[b] * New record from Uganda; 1 = Le Pelley (1959); 2 = Dunbar (1968)

least seven species were new records on the crop in the country. These were the groundnut aphid, A. *craccivora*, bean aphid, *Aphis fabae* Scopoli, a semilooper, *Chrysodeixis chalcites* Esper, tussock caterpillar, *Euproctis subnotata* (Lepidoptera), podfly, *M. chalcosoma* (Diptera), pod wasp, *Tanaostigmodes cajaninae* LaSalle (Hymenoptera), pod weevil, *Apion* sp., and blister beetle, *Mylabris* sp. (Coleoptera).

Most of the pests recorded were rare, being found on a few sampling occasions only, and were therefore considered minor. A few species, however, occurred in substantial numbers in all the cropping seasons (Table 2), and were considered major, particularly those that damaged flowers and/ or pods (Table 1). Of the commonly occurring species, only *A. craccivora* is a vegetative pest, the remaining species, *H. armigera*, *M. testualis*, *E. zinckenella*, *M.chalcosoma*, *T. cajaninae* and *Clavigralla* sp. attack flowers, pods or seeds.

DISCUSSION

Many of the pests that were observed feeding on pigeonpea have been previously recorded on the crop in Uganda. However, several new records were made (Table 1). For aphids, the species reported by Le Pelly (1959) is *Macrosiphum nigrinectaria*. *Aphis fabae* and *A. craccivora* found in the present study have previously not been reported to cause substantial damage in other parts of the world as well (Bindra and Jokhmola, 1967; Singh *et al.*, 1979; Mishra and Odak, 1981; Singh and Rai, 1984; Lateef and Reed, 1985; Bhadauria *et al.*, 1988; Reed and Lateef, 1990; Armstrong, 1991). In Uganda, the species recognised as major pests of pigeonpea are *H. armigera* and *E. zinckenella* (Acland, 1986)

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TABLE 2. Incidence of major pests of pigeonpea on some short- (SD) and medium-duration (MD) pigeonpea grown at Kabanyolo, Uganda, during the long (LR) and short rainy seasons (SR) of 1990,1991 and 1992.

	Season					
	SR 1990	LR 1991		SR 1991		LR 1992
Species	SD	SD	MD	SD	MD	SD
Aphis craccivora (aphids)	145.0 ± 4.7	27.4 ± 1.0	36.1 ± 1.0	574.6 ± 11.4	2244.5 ± 22.5	101.4 ± 1.2
Clavigralla sp. (seed-sucking bugs)	8.4 ± 1.4	18.0 ± 1.2	76.9 ± 1.3	1.0 ± 0.7	40.1 ± 2.6	37.3 ± 2.9
Helicoverpa armigera (bollworm)	4.6 ± 0.7	0.6 ± 0.3	4.6 ± 0.7	2.1 ± 0.7	5.4 ± 0.9	13.1 ± 1.5
Maruca testulalis (cowpea pod borer)	–[b]	1.8 ± 0.4	0.3 ± 0.2	0.3 ± 0.2	0.0 ± 0.0	2.1 ± 0.4
Exelastis atomosa (plume moth)	–	0.0	0.1	0.0	0.7	0.1
Lampides boeticus (blue butterfly)	–	0.1	0.1	0.3	0.3	0.1
Etiella zinckenella (legume pod borer)	–	1.0 ± 0.4	1.8 ± 0.4	0.4 ± 0.3	0.3 ± 0.2	2.8 ± 0.6
Melanagromyza chalcosoma (podfly)	5.2 ± 0.8	1.7 ± 0.6	9.4 ± 0.8	5.8 ± 2.3	2.8 ± 1.5	–

[a]Mean number plant^{-1} ± SE
[b]Data not recorded

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