

INSECT PESTS ASSOCIATED WITH WINGED BEAN IN GHANA

Kwame Afreh-Nuamah

Entomologist, University of Ghana Agricultural Research Station,
Kade, Ghana.

ABSTRACT

Insects associated with 17 varieties of winged bean (*Psophocarpus tetragonolobus*) at preflowering, flowering and post-flowering are presented. Based on the study, the most serious insect pests were the thrips *Taeniothrips* sp., which sucked the plant sap and caused the flowers to die and shrivel; green soldier bug, *Nezara viridula* Linn., and bean pyramid, *Maruca testulalis* Geyer, which fed on the pods and invariably caused their drop. Generally, most of the insects associated with this plant fed on the leaves and stem.

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KEY WORDS: Insect pests. Winged bean. *Psophocarpus tetragonolobus* (L) DC.

INTRODUCTION

The winged bean *Psophocarpus tetragonolobus* (L) DC is used as food in the humid tropics particularly in South East Asia and Western Pacific. In Ghana, the winged bean is not very popular except in the northern part where wild relatives of the bean are eaten as food, particularly during periods of food scarcity (Karikari, 1971). In recent years, however, the University of Ghana Agricultural Research Station at Okumaning has concentrated attention on this crop, and is trying to introduce it to the local community.

The winged bean shows ex-

ceptional promise as a food crop. All parts of the plants are edible. The young leaves, shoots and flowers are popular addition to meals in some areas and provide color and flavor as well as nutrients. The tubers which taste like cassava are used as food. The young tender pods are the most popular part of the crop, and the only part commonly eaten in many parts of the world. Chopped or whole young pods are used either raw or cooked in salad. These may also be added to main dishes such as curries, stews, and soups; stir-fried, deep-fried or pressure-cooked. The pods taste similar to most green beans

particularly French beans, and also mushrooms. Immature winged bean seeds taste similar to garden peas or cowpeas.

This crop is generally considered to be free from insect attacks (Masefield, 1973, Pospisil et al. 1971; Rachie, 1973). Hence, no serious systematic studies have been done on insect pests associated with the crop. But since there is a move from subsistence garden cultivation to intensive cropping, it is expected that insect pests will become important in the commercial cultivation of the crop (Lamb, 1974).

This study was therefore conducted to determine the insects associated with winged bean and which among them are the major insect pests.

MATERIALS AND METHODS

Insect fauna associated with the winged bean was collected in February-May 1982 and June-November 1982 from the University of Ghana Agricultural Research Station, during one of the yield trial experiments. Seventeen varieties of the winged bean *Psophocarpus tetragonolobus* (L) DC namely; UPS 31, UPS 47, UPS 53, UPS 62, UPS 102, UPS 99, UPS 45, UPS 122, UPS 121, UPS 32, LBNC 1, LBNC 3, Thailand, *P. scandens*, Chimbu, TPT 1 and Kade 6/16 were used. The varieties were replicated 4 times in a randomized complete block design. Each variety was planted with trellis 2 rows, 25 m long. The rows were spaced 0.5 m apart

and the plots, 1 m apart.

Sampling for insects started 3 weeks after emergence and weekly thereafter until all the pods were harvested. Observations were made every morning at 2 hr interval starting from 9:00 AM until 5:00 PM. The insects were observed with the hand-height-visual count method from the time of crop emergence until the plants have attained maximum height. All visible parts of the plants were carefully searched and all insects encountered were captured by aspirators, hand-picking, or with sweeping nets. All immature insects were reared to adults in the laboratory. The mature insects were killed with ethyl acetate, pinned and mounted. Dried specimens were identified and kept in insect boxes. The scientific names of all collected insects were also listed and compiled, irrespective of their abundance. Those which were found in appreciable numbers, and were observed to greatly damage the plant by their feeding activities were then catalogued as pests.

RESULTS AND DISCUSSION

The growth cycle of the winged bean was divided into 3 parts: preflowering, flowering and post-flowering. Insects associated with the plant during each period of growth were noted and listed down below:

Preflowering stage

UPS 31 *Coptosoma falloui*; *Rhino-coris* sp.

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UPS 47 *Coptosoma falloui*; *C. stali*
 UPS 53 *Coptosoma stali*; *C. falloui*; *Lagria villosa*
 UPS 62 *C. falloui*; *Riptortus dentipes*; *Lagria cuprina*; *Polyrachis laboriosa*
 UPS 102 *Coptosoma stali*; *C. falloui*; *Oothea mutabilis*; *Aphis* sp.; *L. villosa*
 UPS 99 *Aphis* sp.; *C. stali*; *C. falloui*; *C. nubila*; *Oothea mutabilis*
 UPS 45 *Oothea mutabilis*; *Coptosoma stali*; *Lagria villosa*
 UPS 122 *Coptosoma stali*; *Aphis* sp.; *C. falloui*; *Rhinocoris* sp.
 UPS 121 *Coptosoma falloui*; *Lagria villosa*; *L. cuprina*
 UPS 32 *Riptortus dentipes*; *Coptosoma stali*; *C. falloui*
 LBNC 1 *Riptortus* sp.; *Riptortus dentipes*; *C. stali*; *C. nubila*
 LBNC 3 *Aphis* sp.; *Coptosoma falloui*; *Riptortus dentipes*
 Thailand *Aphis* sp.; *Coptosoma stali*; *Coptosoma falloui*; *Riptortus* sp.
P. scandens *Lagria cuprina*; *Coptosoma stali*
 Chimbu *Coptosoma nubila*; *C. stali*; *Apis mellifera*; *C. falloui*; *Lagria villosa*
 TPT 1 *Lagria villosa*; *Lagria cuprina*; *Coptosoma stali*; *C. falloui*
 Kade 6/16 *Stenocoris sordida*; *Aphis* spp.; *C. stali*; *C. falloui*; *Lagria cuprina*

Flowering stage

UPS 31 *Prosephus* sp.; *Apis mellifera*
 UPS 47 *Camponotus* sp.; *Taeniothrips* sp.; *Apis mellifera*
 UPS 53 *Lagria villosa*; *Coptosoma stali*; *Apis* sp.
 UPS 102 *Coptosoma nubila*; *Coptosoma stali*; *Apis* sp.
 UPS 99 *Coptosoma nubila*; *C. falloui*; *Taeniothrips* sp.
 UPS 45 *Empoasca* sp.; *Coptosoma nubila*; *Maruca testulalis*
 UPS 122 *C. nubila*; *Taeniothrips* sp.; *Apis mellifera*
 UPS 121 *Taeniothrips* sp.; *C. nubila*; *Apis* sp.; *Rhinocoris* sp.
 UPS 32 *C. nubila*; *Apis mellifera*; *Empoasca* sp.
 LBNC 1 *Camponotus* sp.; *Lagria cuprina*; *Rhinocoris* sp.
 LBNC 3 *Lagria villosa*; *C. nubila*; *Taeniothrips* sp.
 Thailand *C. nubila*; *Maruca testulalis*; *Apis* sp.

P.

scandens *Camponotus* sp.
 Chimbu *Rhizopertha dominica*; *Taeniothrips* sp.
 TPT 1 *Empoasca* sp.; *C. nubila*; *Apis* sp.

Kade 6/16 *Coptosoma stali*; *Lagria cuprina*

Post-flowering stage

UPS 31 *C. falloui*, *Prosephus* sp.
 UPS 47 *C. stali*; *C. nubila*; *Euthetus* sp.; *Nezara viridula*
 UPS 53 *Coptosoma falloui*; *Maruca testulalis*

- UPS 62 *Coptosoma nubila*; *Lagria cuprina*; *C. stali*; *C. falloui*
 UPS 102 *C. nubila*; *C. stali*; *Maruca testulalis*
 UPS 99 *Apis mellifera*; *Nezara viridula*; *C. stali*
 UPS 45 *C. stali*; *Anoplocnemis* sp.
 UPS 122 *Riptortus dentipes*; *Prosephus* sp.; *Nezara viridula*
 UPS 121 *Anoplocnemis* sp.; *C. falloui*
 UPS 32 *C. stali*; *Maruca testulalis*; *Riptortus dentipes*
 LBNC 3 *Apis mellifera*; *C. stali*
 Thailand *C. stali*; *Riptortus dentipes*; *C. falloui*
P. scandens —
 Chimbu *Coptosoma nubila*; *Apis mellifera*
 TPT 1 *Riptortus dentipes*; *Lagria cuprina*
 Kade
 6/16 *Riptortus dentipes*; *C. falloui*; *C. stali*

The following insects have been catalogued as pests associated with the plant during each phase of growth:

Preflowering Pests

1. *Lagria cuprina* Thoms. (Coleoptera: Lagriidae)
2. *Lagria villosa* F. (Coleoptera: Lagriidae)
3. *Ootheca mutabilis* Sahil (Coleoptera: Chrysomelidae)
4. *Coptosoma stali* (Mont) (Hemiptera: Plataspidae)
5. *Coptosoma falloui* (Mont) (Hemiptera: Plataspidae)
6. *Aphis craccivora* Koch (Hemiptera: Aphidae)

Flowering Pests

1. *Taeniothrips* sp. (Thysanoptera: Thripidae)
2. *Maruca testulalis* (Geyer) (Lepidoptera: Pyralidae)
3. *Coptosoma nubila* Germ (Hemiptera: Plataspidae)
4. *Lagria villosa* F. (Coleoptera: Lagriidae)
5. *Empoasca* sp. (Coleoptera: Cicadellidae)
6. *Lagria cuprina* Thoms (Coleoptera: Lagriidae)

Post-flowering Pests

1. *Maruca testulalis* (Geyer) (Lepidoptera: Pyralidae)
2. *Anoplocnemis curvipes* F. (Hemiptera: Coreidae)
3. *Riptortus dentipes* (Hemiptera: Coreidae)
4. *Nezara viridula* (L) (Hemiptera: Pentatomidae)

Beneficial insects which were observed to associate with winged bean, and their functions are indicated below:

1. Bumble bee, *Bombus* sp. (Hymenoptera: Apidae) - pollinator
2. Honey bee, *Apis mellifera* (Hymenoptera: Apidae) - pollinator
3. *Rhinocoris* sp. (Hemiptera: Reduviidae) - predator of bugs

Generally, all the varieties were found to be susceptible to insect attack, although the degree of attack differed. The greatest insect damage to the plant was observed on the leaves, stems, flower and pods. At the preflowering and flowering stages, all the insects were observed to be feeding on the

leaves and stem except the thrips which infested the flowers and caused them to dry and shrivel.

The most important pests at post-flowering stage were the green stink bugs, *Nezara viridula* and *Maruca testulalis*. *N. viridula* was found on the developing pods and its feeding punctures caused local necrosis resulting in spotting, deformation and consequent dropping of pod. The larvae of *Maruca testulalis* caused serious destruction of the pods, especially the immature pods. There was no observed insect damage on the dried seeds probably

because of the hard seed coat. The winged bean therefore seems to be devoid of insect pest problems during storage.

The winged bean is a crop with high potential for improving the human diet. Thus, it is crucial to undertake all possible plant protection measures to prevent yield reduction due to pests. It is also necessary to continue to monitor the activities of all organisms associated with the crop and find appropriate means to stop any of their destructive tendencies.

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