# QUEENSLAND DISTRIBUTIONS AND HOST RECORDS FOR *HELIOTHIS* SPECIES (LEPIDOPTERA: NOCTUIDAE)

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## SUMMARY

**Distributions and hosts of the four *Heliothis* species in Queensland are given.**

***H. armigera* (Hubn.), *H. assulta* Gn., *H. punctigera* Wallengr. and *H. rubrescens* (Walk.) occur along the east coast and up to 100 miles inland wherever suitable host plants are available. In inland areas, only *H. punctigera* occurs regularly.**

**All species occur mainly in the September-April period. Larvae prefer the reproductive parts of their hosts as food.**

***H. armigera* is recorded from 23 hosts, *H. punctigera* from 15, *H. assulta* from 3 and *H. rubrescens* from 1. *H. armigera* and *H. punctigera* have similar host ranges, and although mixed populations often occur the presence of two species has not affected control.**

***H. assulta* is important as a pest of cape gooseberries only, and in the absence of suitable control measures is a limiting factor in production of this crop during the warmer months.**


## I. INTRODUCTION

Common (1953) pointed out that in Australia many records of crop damage by *Heliothis armigera* (Hubn.) involved at least another species, *Heliothis punctigera* Wallengr., and possibly also *Heliothis assulta* Gn. and *Heliothis rubrescens* (Walk.). As all these species occur in Queensland, the first three as economic pests, a detailed knowledge of distributions and hosts is desirable.

Work on this project commenced in 1957.

## II. METHODS

Extensive field collections of larvae were made in the vicinities of Ayr, Rockhampton, Nambour, Brisbane, and St. George, with lesser collections from many other parts of the State. These larvae were reared to maturity by methods to be detailed elsewhere, and the resulting adults identified.

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Adults reared from specific hosts by earlier workers and placed in the entomological collection of the Department of Agriculture and Stock have been identified and the relevant information included in the host lists.

Adults attracted to light have also been collected from many centres, and have been used to extend distribution records.

Host records are presented as two lists. In the first, hosts in alphabetical order are placed under the relevant species. Parts of hosts normally attacked and periods when feeding has been recorded are given. In the second, *Heliothis* species are listed under hosts.

## III. DISTRIBUTIONS

Locality records are given in Figure 1. All species occur in coastal areas and up to at least 100 miles inland where suitable hosts occur. In western areas, only *H. punctigera* appears regularly on hosts, but adults of *H. rubrescens* have been attracted to light.

## IV. HOST LISTS

### (a) Heliothis species—Hosts

#### Heliothis armigera

Aizoaceae

*Trianthema portulacastrum* L. (black pigweed). January, February.

Caryophyllaceae

*Dianthus caryophyllus* L. (carnation). November. Flower buds.

Compositae

*Gerbera jamesonii* Bolus (gerbera). December. Flower buds and flowers.

*Helianthus annuus* L. (sunflower). June, July. Seedheads and flowers. These records from North Queensland.

*Lactuca sativa* L. (lettuce). May, June, November. Hearts.

Cruciferae

*Brassica oleracea* L. (cabbage). May. Hearts and young leaves.

Gramineae

*Panicum miliaceum* L. (French millet). March. Heads.

*Sorghum* spp. (grain sorghum). February to May. Heads.

*Zea mays* L. (maize). November to May, August. Young ears.

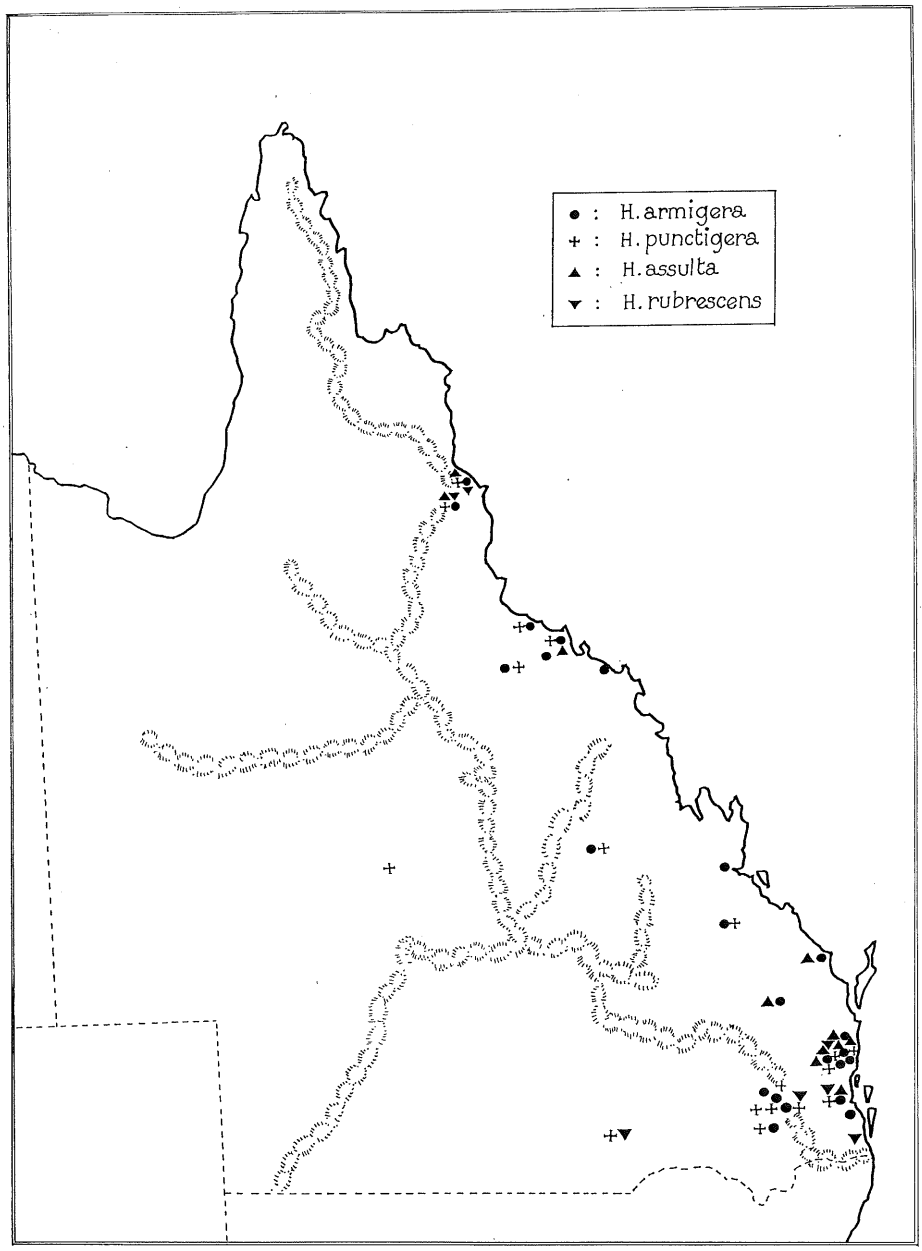


Fig. 1.—Map showing recorded distribution of species of *Heliothis* in Queensland.

Iridaceae

*Gladiolus* sp. (gladiolus). December. Flower buds.

Leguminosae

*Cajanus cajan* L. (pigeon pea). May, July. Pods.

*Medicago denticulata* Willd. (burr medic). September. Young leaves.

*Phaseolus vulgaris* L. (French bean). April, May, October. Pods.

*Pisum sativum* L. (garden pea). September, November. Pods.

Linaceae

*Linum usitatissimum* L. (linseed). September, October. Seedheads.

Malvaceae

*Gossypium hirsutum* L. (cotton). January to April, August. Bolls and squares.

*Hibiscus esculentus* L. (okra). January. Bolls.

Musaceae

*Musa acuminata* Colla (Cavendish banana). May. Young leaves. An isolated record only.

Rosaceae

*Fragaria* × *ananassa* Duchesne (strawberry). May, June, September, October. Young fruit.

Rutaceae

*Citrus sinensis* Osbeck (orange). June, October. Young leaves and fruit.

Solanaceae

*Lycopersicon esculentum* Mill. (tomato). January, April, May, November. Fruit.

*Nicotiana tabacum* L. (tobacco). November to January, March, June. Seed pods, young leaves.

Vitaceae

*Vitis vinifera* L. (grape). May. Fruit. An isolated record.

**Heliothis assulta**

Solanaceae

*Lycopersicon esculentum* Mill. (tomato). April. Fruit. In the single instance recorded, these larvae had evidently migrated from an adjacent eaten-out gooseberry patch.

*Physalis minima* L. (wild gooseberry). November to April. Young fruit. This host is infested invariably.

*Physalis peruviana* L. (cape gooseberry). August to April. Young fruit. This host is usually infested, but numbers are low in winter-grown crops.

**Heliothis punctigera**

Aizoaceae

*Trianthema portulacastrum* L. (black pigweed). January.

Caryophyllaceae

*Dianthus caryophyllus* L. (carnation). November. Flower buds.

Compositae

*Carthamus tinctorius* L. (safflower). October. Seedheads.

*Xanthium pungens* Wallr. (Noogoora burr). May. Young fruits.

Cucurbitaceae

*Citrullus vulgaris* Schrad. (watermelon). October. Shoots.

Iridaceae

*Gladiolus* sp. (gladiolus). December. Flower buds.

Leguminosae

*Medicago sativa* L. (lucerne). October-December. Flowers, pods, leaves.

*Pisum sativum* L. (garden pea). October. Pods.

*Trifolium repens* L. (white clover). October. Young leaves. This host damaged by larvae of 1st spring generation.

Linaceae

*Linum usitatissimum* L. (linseed). September to November. Seedheads.

Malvaceae

*Gossypium hirsutum* L. (cotton). December to March. Bolls.

Rosaceae

*Fragaria* × *ananassa* Duchesne (strawberry). September, November. Young fruit.

Scrophulariaceae

*Antirrhinum majus* L. (snapdragon). December. Flowers.

Solanaceae

*Lycopersicon esculentum* Mill. (tomato). November, December. Fruit.

*Nicotiana tabacum* L. (tobacco). January, November, December. Seed pods, young leaves.

**Heliothis rubrescens**

Compositae

*Sigesbeckia orientalis* L. (Indian-weed). March to May.

## (b) Hosts—Heliothis species

| Botanical Name | Common Name | Species Recorded |
|---|---|---|
| Aizoaceae | | |
| *Trianthema portulacastrum* L. | Black pigweed | *H. armigera*<br>*H. punctigera* |
| Caryophyllaceae | | |
| *Dianthus caryophyllus* L. | Carnation | *H. armigera*<br>*H. punctigera* |
| Compositae | | |
| *Carthamus tinctorius* L. | Safflower | *H. punctigera* |
| *Gerbera jamesonii* Bolus | Gerbera | *H. armigera* |
| *Helianthus annuus* L. | Sunflower | *H. armigera* |
| *Lactuca sativa* L. | Lettuce | *H. armigera* |
| *Sigesbeckia orientalis* L. | Indian-weed | *H. rubrescens* |
| *Xanthium pungens* Wallr. | Noogoora burr | *H. punctigera* |
| Cruciferae | | |
| *Brassica oleracea* L. | Cabbage | *H. armigera* |
| Cucurbitaceae | | |
| *Citrullus vulgaris* Schrad. | Watermelon | *H. punctigera* |
| Gramineae | | |
| *Panicum miliaceum* L. | French millet | *H. armigera* |
| *Sorghum* spp. | Grain sorghum | *H. armigera* |
| *Zea mays* L. | Maize | *H. armigera* |
| Iridaceae | | |
| *Gladiolus* sp. | Gladiolus | *H. armigera* |
| Leguminosae | | |
| *Cajanus cajan* L. | Pigeon pea | *H. armigera* |
| *Medicago denticulata* Willd. | Burr medic | *H. armigera* |
| *Medicago sativa* L. | Lucerne | *H. punctigera* |
| *Phaseolus vulgaris* L. | French bean | *H. armigera* |
| *Pisum sativum* L. | Garden pea | *H. armigera*<br>*H. punctigera* |
| *Trifolium repens* L. | White clover | *H. punctigera* |
| Linaceae | | |
| *Linum usitatissimum* L. | Linseed | *H. armigera*<br>*H. punctigera* |
| Malvaceae | | |
| *Gossypium hirsutum* L. | Cotton | *H. armigera*<br>*H. punctigera* |
| *Hibiscus esculentus* L. | Okra | *H. armigera* |
| Musaceae | | |
| *Musa acuminata* Colla | Cavendish banana | *H. armigera* |
| Rosaceae | | |
| *Fragaria* × *ananassa* Duchesne | Strawberry | *H. armigera*<br>*H. punctigera* |

**(b) Hosts—Heliothis species—*continued***

| Botanical Name | Common Name | Species Recorded |
|---|---|---|
| Rutaceae | | |
| *Citrus sinensis* Osbeck .. | Orange .. .. .. | *H. armigera* |
| Solanaceae | | |
| *Lycopersicon esculentum* Mill. | Tomato .. .. .. | *H. armigera* |
| | | *H. assulta* |
| | | *H. punctigera* |
| *Nicotiana tabacum* L. .. .. | Tobacco .. .. .. | *H. armigera* |
| | | *H. punctigera* |
| *Physalis minima* L. .. .. | Wild gooseberry .. .. | *H. assulta* |
| *Physalis peruviana* L. .. .. | Cape gooseberry .. .. | *H. assulta* |
| Vitaceae | | |
| *Vitis vinifera* L. .. .. | Grape .. .. .. .. | *H. armigera* |

## V. COMMENTS

The seasonal incidence of all species is similar, adults and larvae occurring mainly during the warmer months (September–April), with little activity during winter. Developing reproductive parts of hosts are most attractive as food, but buds and young leaves may be eaten during periods of insect abundance and scarcity of preferred food.

Differences in pest status among species are considerable. *H. armigera, H. punctigera* and *H. assulta* only are recorded from economically important hosts, *H. assulta* having the most restricted host range.

Almost all Heliothis damage in crops except cape gooseberry in coastal and subcoastal Queensland is caused by either *H. armigera* or *H. punctigera* or both, as mixed populations of larvae are common. In inland areas, only *H. punctigera* seems to be involved in attacks on crops. The most significant damage caused by these two species is in linseed, tobacco and tomatoes, and control measures are often necessary to prevent serious losses. Satisfactory chemical controls have been evolved over the years (see, for example, Passlow, Hooper, and Rossiter 1960; Smith 1961), and there is no evidence that the presence of the two species has ever been a factor in control. In the other hosts listed for these species, controls are warranted only occasionally, and methods proved on the more important crops would apply.

Economic damage by *H. assulta* is normally confined to cape gooseberry, and in the absence of satisfactory controls this species has been a limiting factor in the production of the crop during the warmer months for many years. It appears (unpublished data, Queensland Department of Agriculture and Stock) that controls effective against the other species are ineffective against *H. assulta;*

this may be due to either the protection afforded the larvae by the "cape" or a difference in susceptibility to insecticides. Overseas, this species is known as a pest of tobacco (Van der Laan 1940) but attacks in this crop have not been recorded from Queensland.

## VI. ACKNOWLEDGEMENTS

Departmental officers, particularly entomologists, throughout the State have assisted in the collection of adult and larval *Heliothis* specimens from crops in their districts. The staff of the Botany Section has identified botanical specimens and checked the lists for publication. All this assistance is gratefully acknowledged.

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