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RECORDS OF VIRUS DISEASES IN INSECTS IN QUEENSLAND

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SUMMARY

Thirteen nuclear-polyhedrosis and seven granulosis virus diseases affecting 17 species of Lepidoptera in Queensland are recorded.

I. INTRODUCTION

Virus diseases of insects exert considerable influence on certain insect populations but many of them pass unnoticed because of the rapid disintegration of infected individuals. Insect viruses are one of the more promising groups of pathogens with potential as non-insecticidal means of insect control (Heimpel 1965; Ignoffo 1968).

This paper reports the virus diseases of insects recorded in Queensland since 1965 during a wider study of insect pathogens and their possible utilization.

II. METHODS

Collection of specimens.—Dead or diseased larvae collected in the field were transferred to individual containers, with the supporting plant materials if necessary, and stored at 5°C as soon as possible. In some instances larvae collected in the field were maintained in the laboratory and observed for the presence of disease. In addition, where necessary, field-collected adults were allowed to produce progeny in the laboratory and these were similarly observed for the presence of disease. After microscopic examination the cadavers were stored at — 20°C.

Diagnoses.—Diagnoses were based on the appearance of the dead insects and the presence of characteristic inclusions in suspensions of the body contents viewed microscopically with phase contrast. Where possible, an aqueous suspension of the virus particles, partially purified by differential centrifugation, was fed to healthy host insects and the infectious nature of the particles confirmed.

III. RESULTS AND DISCUSSION

Details regarding the occurrence of the various virus diseases are given in Table 1. All have been of the nuclear-polyhedrosis and granulosis types of virus disease in Lepidoptera. These diseases are characterized by the presence of large numbers of crystalline protein inclusions in the body of the dead insect, each

TABLE 1

RECORDS OF VIRUS DISEASES IN INSECTS IN QUEENSLAND

Host Insect	Virus	Source	Location	Date
ANTHELIDAE				
Anthela varia (Walk.)	Nuclear-polyhedrosis	*Macadamia tetraphylla* L. Johnson (Queensland nut)	Brisbane (Sunnybank)	Sept. 1965
		Eucalyptus sp.	Brisbane (Indooroopilly)	Jan. 1966
LYMANTRIIDAE				
Orgyia anartoides (Walk.) (painted apple moth)	Nuclear-polyhedrosis	*Malus sylvestris* Mill. (apple) ..	Stanthorpe	Feb. 1966, Jan. 1968
Orgyia australis Walk.	Nuclear-polyhedrosis	*Malus sylvestris* Mill. (apple) ..	Brisbane (Holland Park)	Jan. 1966
		Mangifera indica L. (mango) ..	Brisbane (Bardon) ..	Nov. 1969
		Pelargonium hortorum Bailey (geranium)	Brisbane (Indooroopilly)	Feb. 1971
Olene mendosa Hubn.	Nuclear-polyhedrosis	Attached to a wall	Brisbane (Indooroopilly)	Oct. 1972
NOCTUIDAE				
Anomis flava F. (cotton looper) ..	Nuclear-polyhedrosis	*Gossypium hirsutum* L. (cotton)	Gatton	Feb. 1971
Heliothis armigera Hubn. (corn ear worm, tomato grub, tobacco budworm, cotton bollworm)	Nuclear-polyhedrosis	Laboratory culture on bean pods (*Phaseolus vulgaris* L.)	Brisbane	Dec. 1965
		Sorghum sp. (grain sorghum) ..	Kingaroy	Mar., Apr. 1970
		Brassica oleracea L. var. *capitata* (cabbage)	Ormiston	Oct. 1967
				Sept. 1968
			Brisbane (Rochedale)	Oct. 1967
Heliothis assulta Guen. (cape gooseberry budworm)	Nuclear-polyhedrosis	*Nicandra physalodes* (L.) Gaertn.	Beaudesert	Dec. 1969
		,,	Brisbane (Rochedale)	Apr. 1970, Jan. 1971
Heliothis punctigera Wallengr. (native budworm)	Nuclear-polyhedrosis	Laboratory culture on bean pods (*Phaseolus vulgaris* L.)	Brisbane	Feb. 1967
H. punctigera and/or, possibly, *H. armigera*	Nuclear-polyhedrosis	*Medicago sativa* L. (lucerne) ..	Gatton	Dec. 1966, Oct. 1970, Oct. 1971, Sept. 1972
		,,	Beaudesert	Oct., Nov. 1967, Oct. 1968, Oct., Nov., Dec. 1969, Oct., Nov. 1971
		,,	Biloela	Oct. 1968
		,,	Helidon	Oct. 1971
		Nicotiana tabacum L. (tobacco)	Beerwah	Jan. 1967
		Arachis hypogaea L. (peanut) ..	Kingaroy	Feb., Mar. 1967
		Gypsophila paniculata L. ..	Gatton	Oct. 1968
		Sorghum sp. (grain sorghum) ..	Cambooya	Feb. 1971
	Granulosis	*Medicago sativa* L. (lucerne) ..	Beaudesert	Dec. 1967, Oct., Nov., Dec. 1969, Oct. 1971
		,,	Biloela	Oct. 1968
		,,	Helidon	Oct. 1971
		Helianthus annuus L. (sunflower)	Jondaryan	Feb. 1970

Heliothis rubrescens (Walk.)	Granulosis	*Sigesbeckia orientalis* L. (Indian weed)	Warwick	Apr. 1971
Plusia argentifera Guen. (tobacco looper)	Nuclear-polyhedrosis	*Brassica oleracea* L. var. *capitata* (cabbage)	Brisbane (Rochedale)	Oct. 1967
Pseudaletia convecta (Walk.) (common armyworm)	Nuclear-polyhedrosis	*Pennisetum clandestinum* Hochst. (kikuyu grass) and *Paspalum dilatatum* Poir. (paspalum)	Evelyn (N. Qd) ..	Dec. 1968
			Dayboro	Apr. 1969
	Granulosis	*Phalaris canariensis* L. (canary grass)	Warwick	Oct. 1969
		Avena sativa L. (oats)	Beaudesert	Aug., Oct. 1969
Spodoptera exempta (Walk.) (day-feeding armyworm) (provisional identification)	Nuclear-polyhedrosis	*Cynodon dactylon* L. Pers. (couch)	Capalaba	Mar. 1966
		Pennisetum clandestinum Hochst. (kikuyu grass) and *Zea mays* L. (maize)	Mount Tamborine ..	Feb. 1967
Spodoptera litura (F.) (cluster caterpillar)	Nuclear-polyhedrosis	*Pelargonium hortorum* Bailey (geranium)	Brisbane (Indooroopilly)	Jan. 1970
	Granulosis	*Rumex brownii* Campd. (dock) ..	Brisbane .. .. (Indooroopilly)	Feb. 1971
PIERIDAE				
Pieris rapae (L.) (cabbage white butterfly)	Granulosis	*Brassica oleracea* L. var. *capitata* (cabbage)	Victoria Point ..	Dec. 1965
			Ormiston	Jan., Oct., Nov. 1966, Feb., Mar., June, July, Sept., Oct., Dec. 1967, Jan., May 1968
			Brisbane (Rochedale)	Oct., Nov., Dec. 1966, Feb., Mar., Sept., Oct., Nov., Dec. 1967, Jan., Feb., May, July, Aug., Sept., Oct. 1968
		Brassica oleracea L. var. *botrytis* (cauliflower)	Brisbane (Rochedale)	July 1967
SPHINGIDAE				
Psilogramma menephron Cram. (Australian privet hawk moth)	Granulosis	*Ligustrum vulgare* L. (privet) ..	Brisbane (Chelmer)	Apr. 1968, Apr. 1969
		Ligustrum sinense Lour. (Chinese privet)	Brisbane (Windsor)	Jan. 1970
TORTRICIDAE				
Cydia pomonella (L.) (codling moth)	Granulosis	Laboratory culture on apple (*Malus sylvestris* Mill.)	Brisbane	June 1967
Merophyas divulsana (Walk.) (lucerne leaf-roller)	Nuclear-polyhedrosis	*Medicago sativa* L. (lucerne) ..	Beaudesert	Dec. 1969

containing one or many rod-shaped virus particles. The surrounding protein apparently serves a protective function for the virus particles, but it also renders them visible with the light-microscope, enabling rapid diagnosis. Improved access to electron microscope facilities will facilitate the diagnoses of other types of virus diseases.

With the exception of the Tortricids and, in some instances, species of *Heliothis,* all the insects listed feed openly, usually on foliage of their host plants. This, no doubt, reflects the susceptibility to infection of insects with this type of feeding habit and the ease of observation of these insects. It is also evident that there has been a strong bias towards host species of economic importance.

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