

STUDIES OF THE COCCOIDEA. 5. THE GENUS *CEROPLASTES* IN QUEENSLAND.

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SUMMARY.

Four species of *Ceroplastes* occur in Queensland, namely *C. ceriferus* (Anderson), *C. destructor* Newstead, *C. floridensis* Comstock, and *C. rubens* Maskell. Two of these—*C. destructor* and *C. rubens*—are widely distributed in coastal and subcoastal areas on a large number of hosts and are of economic importance, particularly in citrus orchards.

INTRODUCTION.

During extensive investigations on the economic species of wax scales in Queensland much information has been accumulated on the distributions and hosts of these insects. The data are now presented in the form adopted in Part 3 of these studies (Brimblecombe 1955).

Genus *CEROPLASTES* Gray.

1830: *Ceroplastes* Gray; *Spicilegia Zoologica*, p. 7.

1867: *Columnea* Targioni-Tozzetti; *Studii sul Cocci*, p. 11.

The genus *Ceroplastes* is comparatively large, with species recorded from most countries of the world. Only one authentic species is described from Australia and this might have originally come from southern Asia (Froggatt 1915). A species described as *C. australiae* (Walker 1852) from Sydney is regarded as being identical with the Indian species *C. ceriferus* (And.).

Five species have previously been recorded from Australia, namely *C. ceriferus*, *C. destructor* Newst., *C. floridensis* Comst., *C. rubens* Mask., and *C. rusci* L. Material in the New South Wales Department of Agriculture representing the record of *C. rusci* on *Melaleuca* sp. from Townsville (Froggatt 1921) has been examined and this is *C. floridensis*.

Ceroplastes ceriferus (Anderson).

(Figs. 1 and 2.)

1791: *Cocci ceriferi* Anderson; *Monographia Cocci ceriferi*, Madras.

1830: *Ceroplastes chilensis* Gray; *Spicilegia Zoologica*, p. 7.

1852: *Ceroplastes australiae* Walker; List of the Homopterous Insects in the British Museum, 4: p. 1087.

1852: *Ceroplastes ceriferus* (Anderson) Walker; List of the Homopterous Insects in the British Museum, 4: p. 1087.

Type locality and host.—India, on *Celastrus ceriferus*.

For many years *C. ceriferus* was regarded as the serious white wax scale insect in eastern Australia, but it was shown that misidentifications had occurred and *C. destructor* was determined as the important species (Zeck 1932). Some of the early Queensland records under the name of *C. ceriferus* refer to *C. destructor*. The Indian species, however, is widely distributed in this State but on a comparatively few hosts.



Fig. 1.

Ceroplastes ceriferus, on *Schinus molle*. (Natural size.)

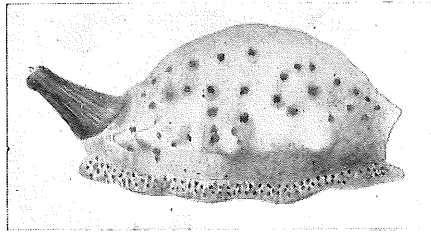


Fig. 2.

Ceroplastes ceriferus. Lateral view of body. (x 12.)

Hosts and distribution.—*Cassinia quinquefaria* R.Br., Terrica, June 1935. *Cedrela toona* Roxb. var. *australis* (F. Muell.) C. DC., Imbil, Feb. 1937. *Citriobatus pauciflorus* A. Cunn., Woodford, Dec. 1940. *Cydonia oblonga* Mill., Beaudesert, Sept. 1917 (H. Tryon). *Diospyros kaki* L.f., Mt. Gravatt, June 1916 (H. Tryon). *Flindersia schottiana* F. Muell., Imbil, Feb. 1937. *Ixora* sp., Brisbane, Jan. 1911 (H. Tryon). *Podocarpus andinus* Poepp., Tamborine Mt., Jan. 1954. *Podocarpus spinulosus* (Sm.) R.Br. ex Mirb., Beerwah, 1945. *Schinus molle* L., Warwick, July 1935. *Schinus terebinthifolius* Raddi, Taringa, 1924 (H. Tryon). *Tamarix gallica* L., Brisbane, 1912 (H. Tryon). *Timonius timon* (Spreng.) Merr., Mackay, Jan. 1952. *Tristania conferta* R.Br., Redland Bay, Apr. 1939.

The following additional localities and hosts have been recorded in Annual Reports by Tryon for the years as shown, but have not been confirmed.

Bignonia, Toowoomba (1915-16); Coffee, Mackay (1908-09); Duranta, Buderim (1897-98), Sandgate (1899-1900), Childers (1902-03), and Brisbane (1918-19); and *Pittosporum undulatum*, Toowoomba (1907-08).

Ceroplastes destructor Newstead.

(Figs. 3 and 4.)

1917: *Ceroplastes destructor* Newstead; Bulletin of Entomological Research, 8: p. 26.

Type locality and host.—Uganda, reported attacking “coffee, cacao, agave, canna, croton, hibiscus, etc.”

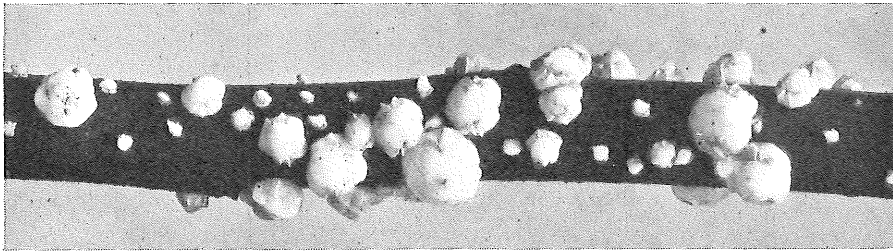


Fig. 3.

Ceroplastes destructor, on *Schinus molle*. (x 1½.)

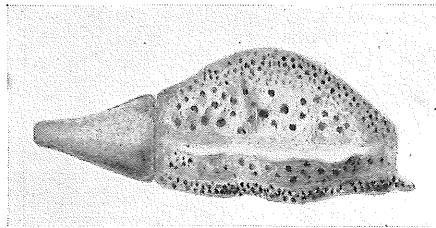


Fig. 4.

Ceroplastes destructor. Lateral view of body. (x 11½.)

When Zeck (1932) established the presence of this species in Australia it was apparently already occurring from Western Australia to north Queensland. Although specimens in the Department's collection were taken prior to the date of Newstead's description, the first record from Queensland was made by Summerville (1934), who considered the insect to be relatively unimportant in commercial citrus orchards, and the list of other hosts was small. This species is now a major pest in the larger citrus-growing districts and is abundant on a wide variety of both native and introduced plants.

Hosts and distribution.—*Achras zapota* L., Gatton, Sept. 1946. *Achronychia laevis* Forst., Beenleigh, May 1956. *Alectryon connatus* (F. Muell. ex Benth.) Radlk., Imbil, Aug. 1948. *Alstonia constricta* F. Muell., Forest Hill, Aug. 1935. *Alyxia ruscifolia* R.Br., Forest Hill, Aug. 1935, Yarraman, May 1952. *Antigonon leptopus* Hook. & Arn., Brisbane, Feb. 1950. *Aster subulatus* Michx., Brisbane, Feb. 1950, Landers Pocket, Feb. 1954. *Astrotricha floccosa* DC., Tugun, Jan. 1950. *Austromyrtus bidwillii* (Benth.) Burret, Beenleigh, May 1956. *Austromyrtus dulcis* (C. T. White) L. S. Smith, Tugun, Jan. 1950. *Baccharis halimifolia* L., Brisbane, Sept. 1945, Eumundi, Jan. 1950; Palmwoods, Nov. 1952, and Yandina, Aug. 1951 (T. Manefield). *Bursaria incana* Lindl., Forest Hill, Aug. 1935, Terrica, June 1935. *Bursaria spinosa* Car., Ipswich, Jan. 1953, Milbong, Oct. 1953, Yarraman, Mar. 1938. *Canthium odoratum* (Forst. f.) Seem., Forest Hill, Aug. 1935, Imbil, Aug. 1948, Terrica, June 1935. *Carissa grandiflora* A.DC., Brisbane, June 1956. *Carissa ovata* R.Br., Forest Hill, Aug. 1935, Gayndah, Aug. 1951, Milbong, Oct. 1953. *Cassinia laevis* R.Br., Fletcher, Nov. 1949, Pikedale, Sept. 1945. *Cassinia quinquefaria* R.Br., Canungra, Apr. 1941, Terrica, June 1935. *Cedrela toona* Roxb. var. *australis* (F. Muell.) C.DC., Imbil, Jan. 1938, Wongabel, Oct. 1938, Yarraman, Apr. 1938. *Celastrus cunninghamii* (Hook.) F. Muell., Forest Hill, Aug. 1935. *Chrysanthemum frutescens* L., Brisbane, Mar. 1951. *Citriobatus pauciflorus* A. Cunn., Gayndah, Aug. 1951, Yarraman, Sept. 1951. *Citrus aurantifolia* (Christm.) Swingle, Brisbane, Oct. 1954; Howard, June 1951 (T. Manefield). *Citrus aurantium* L., Palmwoods, July 1953 (T. Manefield). *Citrus limon* Burm. f., Bouldercombe, Nov. 1953, Gatton, Mar. 1951, Gayndah, Sept. 1953, Howard, June 1951, Nambour, Apr. 1951, and Palmwoods, July 1951 (T. Manefield). *Citrus medica* L., Nambour, Apr. 1952 (T. Manefield). *Citrus paradisi* Macf., Brisbane, Mar. 1945; Caboolture, July 1953, Eidsvold, Mar. 1952, Gayndah, Mar. 1952, Gympie, May 1954, Howard, June 1951, Palmwoods, Jan. 1951, and Yarraman, Mar. 1951 (T. Manefield). *Citrus reticulata* Blanco, Sunnybank, Dec. 1947; Bouldercombe, Nov. 1953, Bundaberg, June 1953, Gayndah, Mar. 1952, Howard, Nov. 1953, and Nambour, June 1951 (T. Manefield); Palmwoods, Jan. 1933 (W. A. T. Summerville); Toowoomba, Dec. 1916 (H. Tryon). *Citrus sinensis* Osbeck, Brisbane, Oct. 1939; Cooroy, Nambour and Palmwoods, Jan. 1933 (W. A. T. Summerville); Bouldercombe, Nov. 1953, Bundaberg, June 1953, Eidsvold, Mar. 1952, Gatton, Mar. 1951, Gayndah, Mar. 1952, and Howard, June 1951 (T. Manefield). *Cupaniopsis anacardioides* (A. Rich.) Radlk., Brisbane, July 1937. *Cuphea micropetala* H.B.K., Brisbane, June 1951. *Denhamia obscura* (A. Rich.) Meissn., Yarraman, Sept. 1951. *Denhamia pittosporoides* F. Muell., North Aramara, July 1939, Pechey, Jan. 1950, Tamborine, Jan. 1954. *Diospyros kaki* L.f., Gayndah, Sept. 1943; Howard, Oct. 1952 (T. Manefield). *Dissilaria bologhioides* F. Muell., Beenleigh, May 1956. *Dodonaea triquetra* Andr., Tugun, Jan. 1950. *Dodonaea viscosa* L., Palmwoods, May 1955 (T. Manefield). *Elaeocarpus reticulatus* Sm., Tugun, Jan. 1950. *Elaeodendron australis* Vent., Forest Hill, Aug. 1935, Milbong Oct. 1953. *Elaeodendron* sp., Brisbane, June 1956. *Eugenia coolminiana*

C. Moore, Tamborine Mt., Oct. 1944. *Euroschinus falcatus* Hook. f., Imbil, Sept. 1938, Mt. Morgan, Oct. 1954, Yarraman, Apr. 1938. *Flindersia bennettiana* F. Muell. ex Benth., Beenleigh, Jan. 1952, Coolangatta, May 1953. *Flindersia collina* F. M. Bail., Yarraman, April 1938. *Flindersia xanthoxyla* (A. Cunn. ex Hook.) Domin, Yarraman, Aug. 1945. *Fortunella japonica* (Thunb.) Swingle, Palmwoods, June 1952 (T. Manefield). *Gardenia* sp., Brisbane, Oct. 1939; Nambour, Dec. 1953 (T. Manefield). *Geijera parviflora* Lindl., Pittsworth, June 1951. *Geijera salicifolia* Schott, Imbil, Jan. 1938, Yarraman, Apr. 1938. *Gerbera jamesonii* Bolus., Brisbane, Mar. 1951; Nambour, Mar. 1954 (T. Manefield). *Helichrysum diosmifolium* (D.C.) Less. ex Steud., Brisbane, May 1935; Forest Hill, Aug. 1935. *Helichrysum* sp., Brisbane, Sept. 1945. *Hodgkinsonia ovatiflora* F. Muell., Toowoomba, Feb. 1951 (A. W. S. May). *Hovea* sp., Fraser Island, Mar. 1938. *Keraudrenia hillii* F. Muell. ex Benth., Brookfield, May 1938. *Lagerstroemia* sp., Brisbane, Oct. 1938. *Loranthus congener* Sieb., Milbong, Oct. 1953. *Loranthus* sp., Brisbane, Jan. 1942. *Lycium ferocissimum* Miers, Fletcher, Sept. 1949. *Maba fasciculosa* F. Muell., Green Island (Moreton Bay), June 1940 (W. A. Smith). *Malus sylvestris* Mill., Toowoomba, July 1946. *Microcitrus australis* (Planch.) Swingle, Yarraman, Apr. 1938. *Nerium oleander* L., Brisbane, July 1953, Terrica, June 1935. *Owenia venosa* F. Muell., Yarraman, Apr. 1938. *Persea americana* Mill., Beenleigh, Mar. 1938, Brisbane, Aug. 1939; Howard, Oct. 1953 and Nambour, Apr. 1952 (T. Manefield). *Phebaleum squameum* (Labill.) Druce, Coolangatta, May 1953. *Pilidostigma rhytispermum* (F. Muell.) Burret, Palmwoods, May 1955 (T. Manefield). *Pittosporum revolutum* Ait., Brisbane, July 1953. *Planchonella pohlmaniana* (F. Muell.) Pierre ex Dubard, Forest Hill, Aug. 1935. *Pleiogynium cerasiferum* (F. Muell.) Domin, Brisbane, July 1953. *Podocarpus elatus* R.Br. ex Mirbel, Brisbane, Mar. 1943. *Psidium guajava* L., Brisbane, Dec. 1938; Buderim, Aug. 1953 (T. Manefield). *Schinus molle* L., Brisbane, Sept. 1946; Howard, Oct. 1952 (T. Manefield). *Secamone elliptica* R.Br., Forest Hill, Aug. 1935. *Severina buxifolia* Ten., Brisbane, June 1956. *Strychnos arborea* A. W. Hill, Brisbane, Mar. 1941, Imbil, Mar. 1938; Toowoomba, Mar. 1951 (A. W. S. May). *Tristania conferta* R.Br., North Aramara, July 1939. *Tristania suaveolens* (Gaertn.) Sm., Redland Bay, May 1952. *Viburnum obovatum* Walt., Brisbane, June 1956.

***Ceroplastes floridensis* Comstock.**

(Fig. 5.)

1881: *Ceroplastes floridensis* Comstock; Report of the United States Department of Agriculture 1880, p. 331.

Type locality and host.—Florida on "all the different citrus plants."

This species was recorded from Australia by Fernald (1903) but neither a definite locality nor a host was given. In Queensland it is now known to occur from the New South Wales border to Cairns, but only in small numbers, on both native and introduced plants.



Fig. 5.

Ceroplastes floridensis, on *Elaeodendron* sp. (x 4.)

Hosts and distribution.—*Elaeodendron* sp., Cairns, Feb. 1954 (W. Pont). Mangrove, Nudgee, Sept. 1911 (H. Tryon). *Melaleuca leucadendra* (L.) L. (sens. lat.), Redland Bay, Sept. 1942, also Glasshouse, Oct. 1942, Carbrook, Nov. 1949, and Tugun, Jan. 1950. *Melaleuca viridiflora* Gaertn., Bowen, Aug. 1950 (W. A. Smith). *Parkinsonia aculeata* L., Ayr, June 1955 (G. W. Saunders). *Pinus taeda* L., Beerwah, Nov. 1941. *Myoporum diffusum* R.Br., Kenmore, Oct. 1954 (R. P. Kleinschmidt).

***Ceroplastes rubens* Maskell.**

(Fig. 6.)

1893: *Ceroplastes rubens* Maskell; Transactions of the New Zealand Institute 1892, 25: p. 214.

Type locality and host.—Queensland, Brisbane on “*Mangifera indica* (mango) and *Ficus macrophylla* (Moreton Bay fig).”

Although described from Australia, the pink wax scale is recorded from many countries of the world. Early records from Ceylon and several eastern countries bordering the Pacific Ocean probably led Froggatt (1915) to suggest that the insect may have been introduced. This species prefers a moist climate and in Queensland occurs mainly in the eastern coastal belt, where it is widely distributed on a variety of hosts. Citrus orchards, mostly oranges and mandarins, are commonly attacked and the insect thus is of some economic importance.



Fig. 6.

Ceroplastes rubens, on *Citrus* sp. (Natural size.)

Hosts and distribution.—*Agonis flexuosa* Schau., Brisbane, June 1956. *Annona squamosa* L., Brisbane, 1911 (H. Tryon). *Brassica actinophylla* Endl., Brisbane, Mar. 1935. *Celastrus cunninghamii* (Hook.) F. Muell., Bowen, Sept. 1945. *Citrus limon* Burm. f., Toowong, June 1911, and Woombye, Apr. 1918 (H. Tryon). *Citrus paradisi* Macf., Brisbane, Apr. 1954. *Citrus reticulata* Blanco, Brisbane, Oct. 1935, Caboolture, Dec. 1938, Forest Hill, Dec. 1928; Buderim, Jan. 1933, and Montville, Jan. 1933 (W. A. T. Summerville). *Citrus sinensis* Osbeck, Brisbane, 1894-95*, Samford, 1895-96*, and Zillmere, June 1911 (H. Tryon); Buderim, Cooroy, Montville, Nambour and Palmwoods, Jan. 1933 (W. A. T. Summerville); Byfield, Oct. 1955, Canungra, May 1941, Charters Towers, Oct. 1955, Coominya, Apr. 1956, Redland Bay, July 1951, Teviotville, July 1954; Rockhampton, Aug. 1954 (T. Passlow). *Citrus* sp., Bowen, 1909-10*, Brisbane, 1897-98*, Burpengary, 1896-97*, Moreton district, 1918-19*, Pine River, 1896-97*, Scrubby Creek, 1913-14*, and Woombye, 1900-01* (H. Tryon).

* Record taken from the Annual Report of the Queensland Department of Agriculture and Stock for the year mentioned.

Coffea arabica L., Brisbane, Feb. 1950. *Cupaniopsis serrata* (F. Muell.) Radlk., Innisfail, Apr. 1948. *Davallia* sp., Brisbane, 1906-07* (H. Tryon). *Elaeodendron* sp., Brisbane, June 1956. *Eremocitrus glauca* (Lindl.) Swingle, Marmor, Oct. 1955. *Eucalyptus* sp., Brisbane, Aug. 1911 (H. Tryon). *Eugenia coolminiana* C. Moore, Coolangatta, May 1953, Tamborine Mt., Oct. 1938. *Eugenia smithii* Poir., Coolangatta, Jan. 1950, Imbil, May 1936, Palmwoods, Mar. 1935; Nambour, Jan. 1933 (W. A. T. Summerville). *Eugenia uniflora* L., Brisbane (Blumberg 1935). *Eugenia ventenatii* Benth., Conondale, May 1956, Petrie, Feb. 1938. *Euphorbia heterophylla* L., Brisbane, May 1945. *Ficus benjamina* L., Brisbane (Blumberg 1935). *Ficus carica* L., Brisbane, 1915 (H. Tryon); Sunnybank, Jan. 1951. *Ficus hillii* F. M. Bail., Brisbane, Feb. 1934, Maryborough, Oct. 1953. *Ficus indica* L., Brisbane, 1897 (H. Tryon). *Ficus* sp., Brisbane, 1898-99* (T. Tryon). *Flindersia australis* R.Br., North Aramara, Apr. 1940. *Flindersia bennettiana* F. Muell. ex Benth., Coolangatta, May 1953. *Flindersia bourjotiana* F. Muell., Gadgarra, Apr. 1941. *Flindersia brayleyana* F. Muell., Gadgarra, Apr. 1941. *Flindersia schottiana* F. Muell., Imbil, Mar. 1937. *Gardenia* sp., Brisbane, 1907-08* (H. Tryon). *Gerbera jamesonii* Bolus., Coominya, Apr. 1956; Brisbane, June 1955 (J. H. Saint-Smith). *Hedera helix* L., Brisbane, Feb. 1950, Murgon, Aug. 1936; Goodna, 1905-06* (H. Tryon). *Ixora* sp., Brisbane, Mar. 1949, Mackay, July 1952, Margate, Jan. 1952. *Mangifera indica* L., Bowen, Oct. 1955, Cairns, Oct. 1955, Innisfail, Oct. 1955; Brisbane, 1894-95*, Bundaberg, 1894-95*, Cleveland, 1902-03*, Mackay, 1909-10*, and Redland Bay, 1897-98* (H. Tryon). *Malus sylvestris* Mill., Brisbane, May 1954. *Melaleuca leucadendra* (L.) L. (sens. lat.) Brisbane, Jan. 1914 (H. Tryon); Caboolture, Jan. 1952, Coolangatta, July 1950, Redland Bay, Oct. 1936, Tugun, Jan. 1951. *Melaleuca nodosa* (Gaertn.) Sm., Carbrook, Oct. 1947; Nudgee, Sept. 1911 (H. Tryon). *Melaleuca viridiflora* Gaertn., Woodstock, July 1950 (W. A. Smith). *Morus alba* L., Brisbane, Feb. 1945, Southport, May 1953. *Musa nana* Lour., Brisbane, 1915 (H. Tryon); Cleveland, Feb. 1934. *Persea americana* Mill., Southport, May 1953, Sunnybank, Jan. 1950, Tamborine Mt., Mar. 1938. *Plumeria rubra* L., Brisbane, Apr. 1951. *Pinus elliotii* Engelm, Bauple, Oct. 1937. *Pinus montezumae* Lambert, Atherton, Oct. 1938. *Pinus radiata* D. Don, Imbil, Jan. 1936, Nanango, Jan. 1944. *Pinus taeda* L., Bauple, Oct. 1937, Beerwah, Jan. 1936, Imbil, Jan. 1936, Mirani, Nov. 1939. *Pittosporum undulatum* Vent., Brisbane, Nov. 1932. *Platynerium bifurcatum* (Cav.) C. Chr., Brisbane, June 1916 (H. Tryon). *Psidium guajava* L., Brisbane, 1915 (H. Tryon). *Punica granatum* L., Brisbane, 1912 (H. Tryon). *Randia fitzalanii* (F. Muell.) F. Muell. ex Benth., Mt. Elliott, July 1951 (W. A. Smith). *Schinus terebinthifolius* Raddi, Brisbane, Jan. 1945; Taringa, Oct. 1924 (H. Tryon). Shade tree, Charters Towers, 1895-96* (H. Tryon). *Wilkiea macrophylla* (A. Cunn.) A.DC., Tamborine Mt., May 1952.

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ADDENDUM.

Since the preparation of this paper the following additional records of *C. rubens* have been obtained. *Citrus aurantifolia*, Mooloolah, Mar. 1955. *Citrus aurantium*, Kilkivan, Aug. 1951. *Citrus limon*, Palmwoods, July 1951. *Citrus paradisi*, South Johnstone, Oct. 1955. *Citrus reticulata*, Ayr, July 1955, Bingal Bay, Aug. 1955, Gayndah, Mar. 1952, Mossman, Jan. 1956, Palmwoods, July 1951. *Citrus sinensis*, Biloela, Nov. 1953, Tewantin, Sept. 1951, Tolga, Sept. 1955. *Diospyros* sp., Nambour, July 1953. *Gerbera jamesonii*, Nambour, Apr. 1954. *Musa nana*, Tully, Mar. 1956. *Psidium guajava*, Coolum, June 1951. The collector was T. Manefield in each instance.