

QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES

DIVISION OF PLANT INDUSTRY BULLETIN No. 309

INSECTS AND MITES ASSOCIATED WITH STORED PRODUCTS IN QUEENSLAND. 1. PSOCOPTERA

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SUMMARY

Fifteen species of Psocoptera of the families Trogidae, Psoquillidae, Psyllipsocidae, Liposcelidae, Pachytroctidae, Lachesillidae, Peripsocidae and Elipsocidae are recorded from stored products in Queensland.

Greatest economic losses from psocid infestations in stored products are concerned with contamination of processed foods, particularly when stored for long periods under domestic conditions. Damage to bulk products by these insects is usually overshadowed by the activities of major stored products pests.

I. INTRODUCTION

In 1903, Tryon (1903, p. 59) reported an infestation of *Atropos divinatoria* in rolled oats at Brisbane. Caldwell (1947a) recorded psocids in Queensland as frequently found in association with grain and grain products or other dried vegetable matter, sometimes swarming in enormous numbers over the surface of the infested materials. He attributed their presence in numbers as an indication that these materials had been held in stock too long, or storage conditions were insanitary, and gave *Troctes divinatorius* Müll. as the common species. Subsequently (Caldwell 1947b) he recorded *T. divinatorius* L. as a minor pest of whole grains, milled cereal products, leguminous seeds and seed products, and in factory and warehouse debris in North Queensland. Most early records from stored products in Queensland referred to *T. divinatorius* but examination of specimens indicates that several species were involved.

Müller (1776) described *Termes divinatorium* and Motschulsky (1853) described *Liposcelis brunneus*. These two species are generally accepted as being cogenetic but Müller's description does not permit recognition of his species. Broadhead (1950) places *L. divinatorius* under the heading "Incertae Sedis". It seems preferable, therefore, not to use the name *L. divinatorius* until such time as it can be applied with certainty to a recognizable species. The identity of Queensland material previously referred to under this name is, therefore, in doubt.

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During 1960–1964 a survey of stored products pests was undertaken by one of us (B.R.C.) and relevant material in the collection of the Department of Primary Industries was examined critically. The results, so far as Psocoptera is concerned, are presented in this paper. Unless stated otherwise, identifications were made by C.N.S.

SPECIES RECORDED

- Cerobasis annulata* (Hagen 1865)
Ectopsocus sp.
Lachesilla sp.
Lepinotus inquilinus Heyden 1850
Lepinotus reticulatus Enderlein 1905
Liposcelis bostrychophilus Badonnel 1931
Liposcelis entomophilus (Enderlein 1907)
Liposcelis pubescens Broadhead 1947
Liposcelis simulans Broadhead 1950
Liposcelis subfuscus Broadhead 1947
Pachytroctes (Neotroctes) sp.
Protopsocus pulchripennis (Perkins 1889)
Psocatropos lachlani (Enderlein 1903)
Psoquilla marginepunctata Hagen 1865
Trogium pulsatorium (Linnaeus 1758)

RECORDS

Trogiidae

Cerobasis annulata

No data (label missing), but part of a stored product pest collection made by B.R.C. during 1961: in D.P.I. Collection.

Lepinotus inquilinus

Ex maize residue in harvester, Kingaroy, 7.xi.1963, B.R.C.: in D.P.I. Collection.

Lepinotus reticulatus

Ex bulk wheat in farm store, Bongeene, 27.ix.1960, B.R.C. (det. J. V. Pearman, Commonwealth Institute of Entomology, 1962): in British Museum (Natural History).

Trogium pulsatorium

Ex maize residue in harvester, Kingaroy, 7.xi.1963, B.R.C.: in D.P.I. Collection.

Psoquillidae

Psoquilla marginepunctata

Ex salami sausage, Brisbane, Jan. 1948, 2.ii.1948, J. A. Weddell: in D.P.I. Collection.

Psyllipsocidae

Psocatropos lachlani

Infesting ? on swarms (winged), Brisbane, 10.i.48: in D.P.I. Collection.

Liposcelidae*Liposcelis entomophilus*

Ex damp wheat spillage, Dalby, 29.ix.1960, B.R.C. (det. J. V. Pearman 1962); on wheat residues in loading hoppers on wharf, Pinkenba, 15.xii.60, B.R.C. (det. J. V. Pearman 1962); ex nut-in-shell peanuts in silo, Kingaroy, 1.x.1963, B.R.C.: in D.P.I. Collection.

Liposcelis bostrychophilus

Ex powdered potato, Capella, Sept. 1956, R. P. Kleinschmidt; ex mixed grain residue in farm silo, Bongeen, 27.ix.1960, B.R.C.; ex wet and mouldy wheat residue in farm silo, Bongeen, 27.ix.1960, B.R.C.; ex bagged nut-in-shell peanuts exposed to weather, Kingaroy, Apr. 1962, B.R.C.; ex sorghum gradings on farm, Kingaroy, 7.xi.63, B.R.C.; ex sorghum in bulk bin on farm, Kingaroy, 7.xi.63, B.R.C.; ex bulk wheat delivered from farm to storage, Evanslea, Nov. 1963, B.R.C.; ex *Rhizopertha dominica* F. culture, Indooroopilly, May 1964, B.R.C.: in D.P.I. Collection.

Liposcelis pubescens

Ex bagged nut-in-shell peanuts exposed to weather, Kingaroy, Apr. 1962, B.R.C.: in D.P.I. Collection.

L. sp. nr. pubescens

Ex seed from U.S.A.: in D.P.I. Collection.

Liposcelis subfuscus

Ex nut-in-shell peanuts in silo, Kingaroy, 29.viii.1961, B.R.C.; ex bagged nut-in-shell peanuts exposed to weather, Kingaroy, 15.i.1962, B.R.C.; ex sorghum in bulk bin on farm, Kingaroy, 7.xi.1963, B.R.C.; ex sorghum gradings on farm, Kingaroy, 7.xi.1963, B.R.C.; ex peanut trash on harvester, Booie, 18.xii.1963, B.R.C.: in D.P.I. Collection.

Liposcelis simulans

Ex flour, 30.i.1952; in D.P.I. Collection.

Pachytroctidae*Pachytroctes sp.*

Ex bagged nut-in-shell peanuts exposed to weather, Kingaroy, Apr. 1962, B.R.C.: in D.P.I. Collection.

Lachesillidae*Lachesilla sp. prob. sp.n.*

Ex bagged nut-in-shell peanuts exposed to weather, Kingaroy, Apr. 1962, B.R.C.; ex nut-in-shell peanuts in silo, Kingaroy, June 1962, B.R.C.: in D.P.I. Collection.

Peripsocidae*Ectopsocus sp. prob. sp.n.*

Ex wheat residues at intake to flour mill, Dalby, 29.ix.1960, B.R.C. (det. J. V. Pearman 1962); ex bulk new season barley, Oakey, 15.xii.1960, B.R.C. (det. J. V. Pearman 1962): in British Museum (Natural History). Ex nut-in-shell peanuts in silo, Kingaroy, 1.x.1963, B.R.C.; ex sorghum gradings on farm, Kingaroy, 7.xi.1963, B.R.C.; ex peanut trash on harvester, Booie, 18.xii.1963, B.R.C.: in D.P.I. Collection.

Elipsocidae*Proposocus pulchripennis*

Ex nut-in-shell peanuts in silo, Kingaroy, June 1962, B.R.C.: in D.P.I. Collection.

COMMENTS

Farm grain storages and associated spillage are usually infested with major grain pests, and moisture accumulation and mould growth are common. Similarly, spillage at central storage intake points and residues in grain-handling equipment exposed to the weather when wet by rain provide ideal conditions for psocid infestation. In all these situations the position is aggravated by the accumulation of dust of the product concerned.

The preponderance of records from peanuts indicates more intensive collecting only: direct counts were made of psocids associated with insecticide trials at the Peanut Marketing Board's silos at Kingaroy, where most of the Queensland crop is stored. Nut-in-shell peanuts in the silos were usually infested with surface moulds to some extent as a result of moisture redistribution in undisturbed storage. Numbers were sometimes high and the infestations were usually associated with large populations of insects other than psocids (Champ 1965). The earliest reports of large numbers of psocids in peanuts from the silos at Kingaroy were in 1938 following a "wet" harvest, and subsequently (1942) *Lachesilla* sp. were recorded flying around electric lamps beneath the silos: no specimens are available (unpublished Departmental records).

Greatest economic losses from psocid infestations in stored products are concerned with contamination of processed foods, particularly when stored for long periods under domestic conditions. Damage to bulk products by these insects is usually overshadowed by the activities of major stored products pests.

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