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INSECTS AND MITES ASSOCIATED WITH STORED PRODUCTS IN QUEENSLAND
2. LEPIDOPTERA

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SUMMARY

Thirty-seven species of Lepidoptera of the families Pyralidae, Phycitidae, Galleriidae, Tortricidae, Gelechiidae, Cosmopterygidae, Oecophoridae, Lyoneiidae, Tineidae and Eriocraniidae are recorded from stored products in Queensland.

Cadra cautella **(Walk.) is the major lepidopterous pest of grain, peanuts and similar commodities on farms, in bulk and bag storages, and in warehouses in southern and central Queensland. It is also the major species concerned with losses of processed food in homes. In North Queensland,** Corcyra cephalonica **(Staint.) assumes greater importance.**

INTRODUCTION

The first specific reference to Lepidoptera associated with stored products in Queensland concerned *Galleria mellonella* (L.); this was made in the Minutes of the Acclimatisation Society in 1875 and was reported subsequently by Roff (1957). Meyrick (1879, 1880*a*, 1884, 1887) reported as established in Queensland a number of the more important pest species, viz. *Pyralis* spp., *Plodia interpunctella* Hübn., *Ephestia elutella* Hübn., *Galleria mellonella* (L.) and *Phthorimaea operculella* (Zell.). Tryon (1895) added *Sitotroga cerealella* (Oliv.); he also recorded the establishment of *Cydia pomonella* (L.) from apples imported from Tasmania. Turner (1904, 1907) first listed *Achroia grisella* (F.) and *Corcyra cephalonica* (Staint.), and Jarvis (1913) listed *Anagasta kuehniella* (Zell.), but it was not until 1924 (Turner 1924) that *Cadra cautella* (Walk.), the major pest species today, and reported from Australia by Meyrick in 1895, was recognized in Queensland.

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The first detailed survey of stored products fauna was made by Caldwell during 1939-1945 as a result of concern over wartime food supplies and was restricted to the major pest species in grain, oil-seeds and milled products, particularly in North Queensland (Caldwell 1947*a*). Subsequently Caldwell (1947*b*) published detailed descriptions, pest status, life history and control of the more important species.

This report is the second of a series (see Champ and Smithers 1965) covering a survey of the arthropod fauna of stored products in Queensland carried out during 1960-1964. The data gathered have been supplemented by relevant literature, unpublished reports of the Queensland Department of Primary Industries, and material held in various Collections, notably those of this Department and the Australian National Insect Collection.

Data are presented under headings of "Distribution" and "Recorded Foods and Habitats". *Distributions* are given as follows: a statement of world distribution; published records from elsewhere in Australia if these precede the first Queensland record; and Queensland records giving general references first, then specific localities and the year of the first records from these localities together with reference or with actual insect material, the authorities who have determined the material and in parentheses the collection in which the material is held, and finally the months of the year in which occurrence has been recorded. Where references or authorities are not given, material has been determined by the author. *Recorded foods and habitats* are given as follows: statements, if any, from references to the Queensland scene; and specific records giving the food or habitat, locality, year of record, collection where held, and the authority who determined the material. Again, where references or authorities are not given, this author holds responsibility.

The author is indebted to the Commonwealth Institute of Entomology and to Mr. I. F. B. Common of the Commonwealth Scientific and Industrial Research Organization, Canberra, for many of the determinations, and where the authority involved is known, this is listed. The following abbreviations have been used together with the years in which the determinations were made— CIE (Commonwealth Institute of Entomology); JDB, J. D. Bradley 1961, 1963 (CIE); TGC, T. G. Campbell (1964); RJC, R. J. Collins 1956, 1957 (CIE); IFBC, I.F.B. Common 1964; ELM, E. L. Martin 1955 (CIE); MS, M. Shaffer 1963 (CIE); WHTT, W.H.T. Tams 1957 (CIE); AJT, A. J. Turner 1947; PESW, P.E.S. Whalley 1963 (CIE). The abbreviations DPI and ANIC have been used to denote the Department of Primary Industries Collection and the Australian National Insect Collection respectively.

SPECIES RECORDED

Achroia grisella (Fabricius 1794)
Agathiphaga queenslandensis Dumbleton 1952
Aglossa caprealis (Hübner [1800]–[1809])
Aglossa pinguinalis (Linnaeus 1758)

Anagasta kuehniella (Zeller 1879)
Brachyacma palpigera (Walsingham 1891)
Cadra cautella (Walker 1863)
Cadra figulilella Gregson 1871
Corcyra cephalonica (Stainton 1866)
Cryptoblabes gnidiella (Millieŕe 1867)
Cydia pomonella (Linnaeus 1758)
Endrosis sarcitrella (Linnaeus 1758)
Ephestia elutella (Hübner 1796)
Erechthias caustophara Turner 1923
Etiella behrii Zeller 1848
Etiella zinckenella (Treitschke 1832)
Galleria mellonella (Linnaeus 1758)
Hieroxestis omoscopa Meyrick 1892
Hofmannophila pseudospretella (Stainton 1849)
Hypsopygia costalis (Fabricius 1775)
Laspeyresia metallocosma (Lower 1901)
Lindera tessellatella Blanchard 1852
Monopis meliorella (Walker 1963)
Niditinea fuscipunctella (Haworth 1828)
Phthorimaea operculella (Zeller 1873)
Phycita sp.
Plodia interpunctella (Hübner 1811-1817)
Pyralis caustica (Meyrick 1884)
Pyralis farinalis (Linnaeus 1758)
Pyralis manihotalis (Guenée 1854)
Sathrobrota badia Hodges 1962
Sathrobrota rileyi (Walsingham 1882)
Setomorpha rutella Zeller 1852
Sitotroga cerealella (Oliver 1789)
Tinea pellionella (Linnaeus 1758)
Tineola bisselliella (Hummel 1823)
Trichophaga tapetzella (Linnaeus 1758)

Pyralidae

Aglossa caprealis

Distribution.—Cosmopolitan (Corbet and Tams 1943). New South Wales as *A. cuprealis* Hb. (Meyrick 1887). SOUTH QUEENSLAND: *Brisbane* as *A. cuprealis* (Turner 1904), 1902 det. MS (DPI), Nov.; *Toowoomba* 1936 det. AJT (ANIC), det. MS (DPI), Nov.; *Yarraman* 1965 (DPI), Dec.

Recorded foods and habitats.—Lucerne hay, Toowoomba det. AJT (ANIC) and MS (DPI); "larva in silken galleries amongst chaff, maize, etc.," det. MS (DPI); adults in maize store, Yarraman 1965 (DPI).

Notes.—A. caprealis is a minor pest of lucerne hay. All records have been made in November and December covering the years 1902, 1907, 1908, 1909, 1912, 1936 and 1965.

Aglossa pinguinalis

Distribution.—Victoria (Meyrick 1887); Tasmania (Turner 1904). QUEENSLAND.

Note.—The only reference to this species is a Department of Primary Industries record as a host of *Stomatoceras pomonellae* Cameron (Hymenoptera).

Hypsopygia costalis

Distribution.—Cosmopolitan (Corbet and Tams 1943). NORTH AND CENTRAL QUEENSLAND: *Cooktown, Mackay,* Nov. (Lower 1900).

Pyralis manihotalis

Distribution.—Indo-Australian region, tropical and south Africa, tropical America, Hawaii (Corbet and Tams 1943). NORTH QUEENSLAND: *Cooktown* as *Asopia gerontialis* Walk. (Meyrick 1887); *Malanda* (Turner 1924); *Kuranda* 1904, Feb., *Atherton* 1911, May, June, *Cairns, Lake Barrine,* 1939, June, *Stannery Hills,* det. AJT (ANIC): CENTRAL QUEENSLAND: *Banana* 1923 det. AJT (ANIC), Mar.: SOUTH QUEENSLAND: *Brisbane* (Turner 1904), 1897 det. MS (DPI), Mar. to June; *Dalby* 1925 det. AJT (ANIC), Dec.

Recorded food and habitats.—"Larva feeds on dry stuff about houses in the warmer parts of Australia" (Tillyard 1926).

Note.—Meyrick (1888) states that *P. manihotalis* appears to take the place of *P. farinalis* throughout the tropical regions of the old world.

Pyralis farinalis

Distribution.—Cosmopolitan, but more plentiful in temperate than in tropical regions (Corbet and Tams 1943). SOUTH QUEENSLAND: Toowoomba, Oct. to Apr., June, as *Asopia farinalis* L. (Meyrick 1887), 1934 det. IFBC (ANIC), Oct.; *Brisbane* (Turner 1904), 1902 det. AJT (ANIC), Oct. to May; *Eumundi* 1902 det. AJT (ANIC), Nov.; *Nambour, Stanthorpe* (Turner *op. cit.*); *Dalby* 1925, Dec., *Gayndah,* det. AJT (ANIC); *Kingaroy* 1962 (Champ 1965); *Cooroy* 1963, Oct.; *St. George* det. CIE.

Recorded foods and habitats.—A minor pest of stored cereals (Caldwell 1947*b*). Peanuts stored in silos and spillage beneath bag stacks (Champ *op. cit.*). Records include: stored wheat, Brisbane 1912 det. PESW (DPI); flour mill, Brisbane det. MS (DPI); breeding in wheat spillage, Dalby 1961, maize residues, Cooroy 1963.

Notes.—*P. farinalis* breeds commonly in grain spillage in south Queensland where wetting from rain or condensation has occurred. It has been reported as a pest of peanuts in silo storage but again this has been associated with "wet" storage conditions. Adults are taken frequently in kitchens and pantries. *P. farinalis* can be regarded only as of incidental importance, usually indicating lack of storage hygiene.

Pyralis caustica

Distribution.—CENTRAL QUEENSLAND: *Duaringa* as *Asopia caustica* (Meyrick 1884): SOUTH QUEENSLAND: *Brisbane* 1916 det. AJT (ANIC), Oct. to June.

Note.—There is a record of *P. ? caustica* adults (det. IFBC) from underground galleries of the Brisbane export wheat terminal on 3.iv.1964.

Phycitidae

Phycita sp.

Records.—Destroyed cheese, Brisbane, 23.i.10, coll. Benson; larvae destroys dates, Brisbane, 15.x.12, coll. Jarvis; Brisbane, 24.iii.60, coll. E. Exley; Southport, coll. J. McG. Wills: det. PESW, in DPI Collection.

Plodia interpunctella

Distribution.—Cosmopolitan (Richards and Herford 1930). New South Wales (Meyrick 1879, Froggatt 1898, 1903). SOUTH QUEENSLAND: *Brisbane* (Tryon 1897, Turner 1904), 1902 det. AJT (ANIC), Sept. to Apr.; *Dalby* 1934, det. AJT (ANIC), Oct.; *Nambour* 1935 det. MS (DPI), Jan.; *Kingaroy* 1940 (Champ 1965) Jan. to Dec.; *Booie* 1963, Dec.: CENTRAL QUEENSLAND: *Mackay* 1926 det. AJT (ANIC), Mar., June; *Biloela* 1954 det. ELM (DPI), Mar.; *Capella* 1957 (DPI), Sept.: NORTH QUEENSLAND: *Bowen* 1941 (DPI), Apr.; *Mareeba* 1942 (DPI), Jan.; *Richmond* 1942 (DPI), Feb.; *Pentland* 1942, Feb.; *Townsville* 1942, Mar., May; *Charters Towers* 1942, Apr.; *Cairns* 1943, Feb.; *Atherton* 1942 (DPI), Mar., May.

Recorded foods and habitats.—In large numbers in a soft-goods warehouse probably introduced with packing, Brisbane 1897 (Tryon *op. cit.*). Infesting dried maize, currants, etc. (Turner *op. cit.*). An important pest of dried fruits, nuts and nut meats, also infests milled cereal products such as flour, bran, pollard, and highly processed breakfast foods if stored for unduly long periods or under extremely unhygienic conditions (Caldwell 1947*b*). North Queensland: milled cereal products, processed cereal products, dried fruits, nuts and nut meats—of minor importance; factory and warehouse debris—of very minor importance: Caldwell (1947*a*). A major pest of grain particularly in country storages (Champ 1963). Peanuts in bag stacks and silos—occasionally a major pest (Champ 1965).

Records include: chocolate, Brisbane 1909 det. PESW (DPI), 1946 det. MS (DPI); gladiolus bulbs, 1910; raisins 1942 (DPI); prunes, Brisbane 1919 det. MS (DPI); garlic, Brisbane 1942 (DPI); walnuts, Brisbane 1911 det. MS (DPI); peanuts, Atherton 1950 det. PESW (DPI), Kingaroy (Champ 1965); residues in peanut thresher, Booie 1963; lucerne seed, Brisbane 1912 det. PESW, onion seed 1947 (DPI); "bred from *Eriochloa pseudoacrotricha*", Biloela 1954 det. ELM (DPI); maize cobs, Brisbane 1910 det. MS (DPI); dried pears, Pentland 1942 (DPI); debris from maize silos, Atherton 1942 (DPI); cracked maize, wheat bran and pollard, Bowen 1942 (DPI); flour, Richmond det. MS, Mackay, Bowen, 1942 (DPI); wheatmeal flour, Mareeba, Townsville, 1942 (DPI); wheat meal, Charters Towers 1942; split peas, Cairns 1943 (DPI); sorghum, Capella 1957 (DPI); barley, dates, Brisbane 1961 (DPI).

Notes.—P. interpunctella though a major pest species is considerably less important than *Cadra cautella* and infestations frequently tend to be localized. Parasites recorded in Queensland are *Bracon hebetor* Say and *Devorgilla canescens* (Gravenhorst) (Hymenoptera) and *Mattesia dispora* Naville (Protozoa, Martin and Champ 1964).

Ephestia elutella

Distribution.—Cosmopolitan (Richards and Herford 1930). New South Wales (Meyrick 1879); Western Australia (Meyrick 1887); Victoria (Turner 1904). SOUTH QUEENSLAND: *Brisbane* (Tryon 1903), 1929 det. MS, Apr., July; *Glasshouse Mountains* 1936 det. MS, Oct. (DPI); *Bundamba* 1965, July, Aug., Sept.

Recorded foods and habitats.—In date fruit, Brisbane 1903 (Tryon *op. cit.*). Tobacco and other stored products, not common (Caldwell 1947*b*).

Records include: breeding in tobacco leaf in warehouse, Brisbane 1941 det. MS (DPI), Bundamba 1965; eating flowers of *Macadamia,* Glasshouse Mts. 1936 det. MS (DPI); bags of cotton from Uganda, Brisbane 1929 det. MS.

Note.—E. elutella is not common in Queensland and most records refer to tobacco in storage from which occasional outbreaks are reported.

Cadra cautella

Distribution.—Cosmopolitan (Richards and Herford 1930). Australia as *Ephestia cahiritella* Zeller (Meyrick 1895, Turner 1904). SOUTH QUEENSLAND: *Brisbane* 1900 det. IFBC (ANIC), Mar. to Aug., Dec.; *Kingaroy* 1935 det. MS (DPI) (Champ 1965), Jan. to Dec.; *Toowoomba* 1942 det. MS (DPI), Jan.; *Cooroy, Wondai,* 1963, Oct.; *Booie* 1963, Dec.; *Kalbar* 1964 det. IFBC (DPI), Apr.: NORTH QUEENSLAND: *Kuranda* 1905 det. IFBC (ANIC), Oct.; *Atherton, Herberton* as *Ephestia cautella* (Turner 1924); *Innisfail* 1942 det. MS (DPI), May. CENTRAL QUEENSLAND: *Springsure* 1958 det. MS (DPI), Aug.; *Gladstone* 1965, Jan., Feb.

Recorded food and habitats.—An important pest of dried fruits, peanuts, other nuts, nut meats and processed foods containing these materials, flour, bran, pollard and other grain products, dried vegetables such as peas, and whole grain such as maize (Caldwell 1947*b*). North Queensland: milled cereal products—of intermediate importance; crushed and cracked grains, processed cereal products, leguminous seeds and seed products, dried fruits, factory and warehouse debris—of minor importance; whole grain—of very minor importance (Caldwell 1947*a*). A major pest of grain particularly in country storages (Champ 1963). A major pest of peanuts stored in bag stacks and silos in south Queensland (Champ 1965).

Records include: maize box, Brisbane 1900 det. IFBC (ANIC); nutmegs 1912, bags of cotton seed ex Uganda 1929, all spice 1931, bran 1945, cocoa beans ex Gold Coast, raisins, flour mill, Brisbane, det. MS (DPI); peanuts, Kingaroy 1935, 1936, 1942, Toowoomba 1942, det. MS (DPI); residues in peanut thresher, Booie 1963; wholemeal flour, Innisfail 1942 det. MS (DPI); stored sorghum, Springsure 1958 det. MS (DPI), Wondai 1963 (DPI); sorghum heads in field, Kalbar 1942 (DPI); maize, Cooroy 1963; wheat, Brisbane 1964 det. IFBC (DPI), Gladstone 1965; rat poison 1954 det. RJC (DPI).

Notes.—*C. cautella* is the major lepidopterous pest of grain, peanuts and similar commodities on farms, in bulk and bag storages, and in warehouses in south and central Queensland. It is also the major species concerned with losses of processed food in homes. In North Queensland, *Corcyra cephalonica* assumes a more important pest status. Parasites recorded are *Bracon hebetor* Say and *Nevorgilla canescens* (Gravenhorst) (Hymenoptera), *Mattesia dispora* Naville (Protozoa, Martin and Champ 1964) and *Bacillus thuringiensis* Berliner.

Anagasta kuehniella

Distribution.—Almost cosmopolitan (Richards and Herford 1930). Australia as *Hyphantidium sericarium* (Scott 1859, Meyrick 1880*b*); New South Wales (Fuller 1896). SOUTH QUEENSLAND (as *Ephestia kuehniella* Tryon 1912, Jarvis 1913): *Brisbane* 1912 (DPI), Feb., Apr., July: NORTH QUEENSLAND: *Mareeba* 1942 det. MS (DPI), Jan.; *Atherton* 1942 May; *Charters Towers* 1942 (DPI), Dec.

Recorded foods and habitats.—Primarily a pest in flour mills but occasionally in flour especially wholemeal flour away from the mill; also in premises where cereals ground and processed (Caldwell 1947*b*). North Queensland, milled cereal products, factory and warehouse debris—of minor importance (Caldwell 1947*a*).

Records include: flour mills, Brisbane det. PESW (DPI), 1912 (DPI), 1946 det. MS (DPI); wholemeal flour, Mareeba 1942 det. MS (DPI), Charters Towers 1942 (DPI); debris from maize silo, Atherton 1942.

Notes.—*A. kuehniella* is common as listed above. Parasites recorded are *Bracon hebetor* Say and *Nevorgilla canescens* (Gravenhorst) (Hymenoptera) and *Mattesia dispora* Naville and *Adelina mesnili* (Perez) (Protozoa, Martin and Champ 1964).

Cadra figulilella

Distribution.—Europe, the Mediterranean Basin to West Africa and India (Corbet and Tams 1943). New South Wales as *Ephestia ficulella* Barrett (Meyrick 1880*b*); Western Australia as *E. desuetella* (Meyrick) (Meyrick 1887). SOUTH QUEENSLAND: *Brisbane* as *Ephestia figulilella* (Turner 1904).

Recorded food and habitat.—Infesting dried maize (Turner *op. cit.*).

Etiella zinckenella

Distribution.—Southern Europe and almost all the warmer parts of the world (Corbet and Tams 1943). ? Australia (Turner 1904). SOUTH QUEENSLAND, as *Etiella zinkenia* Meyrick (Smith 1943): *Brisbane* 1898 det. CIE, Apr., Aug., Nov.; *Bribie Island* 1915 det. CIE, Oct.; *Ipswich* 1936 det. CIE, Nov.; *Moggill* 1945 det. CIE, May; *Ormiston* 1955 det. RJC (DPI), Mar.; *Nambour* 1962 (DPI), Feb.: NORTH QUEENSLAND: *South Johnstone* 1952, Aug.; *Millaroo* 1962 (DPI), Feb.

Recorded foods and habitats.—Pod borer of soybeans and other legumes (Smith *op. cit.*).

Records include: ex pods of soybeans, Moggill 1945 det. CIE; ex pods of native creeper, Bribie Island 1915 det. CIE; larvae ex pods of *Crotalaria* spp., *Crotalaria striata* Brisbane 1945 det. CIE, *C. juncea* South Johnstone 1952 det. CIE, *Crotalaria* sp. Ormiston 1955 det. RJC (DPI), *C. spectabilis* Nambour 1962 (DPI), *C. mucronata* Nambour 1962 (DPI), *C. incana glabrescens* Millaroo 1962 (DPI); at light, Brisbane 1935 det. CIE.

Notes.—Meyrick (1886) reported seeing a similar closely related species to *Siculodes anticalis* Walker (=*E. zincknella*) from north Australia. Possible parasites recorded are *Campyloneurus* sp., *Cremastus* (*Trathala*) sp., *Ipobracon* sp., *Phanerotoma* sp. and *Pristomerus* sp. (Hymenoptera).

Etiella behrii

Distribution.—New South Wales, Victoria, South Australia (Meyrick 1879). SOUTH QUEENSLAND: *Brisbane* 1901 det. CIE, Aug., Oct.; *Cambooya* 1947 det. CIE, Mar.: NORTH QUEENSLAND: *Millaroo* 1962 det. CIE, June.

Recorded foods and habitats.—At light, Brisbane 1935 det. CIE; in soya bean field, Cambooya 1947 det. CIE; ex seeds *Phaseolus atropurpureus,* Millaroo 1962 det. CIE.

Cryptoblabes gnidiella

Distribution.—Mediterranean Basin (Corbet and Tams 1943). NORTH QUEENSLAND: *Mt. Elliott* 1956 det. WHTT, June: SOUTH QUEENSLAND: *Nambour* 1957 det. WHTT, Jan.

Recorded foods and habitats.—Larvae tunnelling in stems of *Dendrobium undulatum* (Orchidaceae), Mt. Elliott 1956 det. WHTT; larva on maize cob, Nambour 1957 det. WHTT.

Galleriidae

Galleria mellonella

Distribution.—Cosmopolitan (Corbet and Tams 1943). SOUTH QUEENSLAND (Meyrick 1879, Hacker 1935): *Brisbane* 1875 (Roff 1957), *Dalby* (Turner 1904).

Recorded foods and habitats.—Larvae feed in beehives on wax (Meyrick *op. cit.*). *G. mellonella* is essentially a pest of bee-combs, but may also damage brood, frames and the hive; damage is most severe in stored combs, whether in the apiary or storehouse; infestations are also possible in active hives where empty combs may be destroyed, brood killed and honey lost (Roff and Brimblecombe 1958, 1963; Roff 1960). A contaminant of comb honey in commerce (C. Roff, personal communication).

Achroia grisella

Distribution.—Throughout the Old World (Corbet and Tams 1943). New South Wales, Victoria (Meyrick 1879). SOUTH QUEENSLAND (Hacker 1935): *Brisbane, Nambour* as *Meliphora grisella* (Turner 1904); *Brisbane* 1911 det. MS (DPI), Aug., Sept.: NORTH QUEENSLAND: *Dimbulah* 1933 det. MS (DPI), Dec.

Recorded foods and habits.—Dried figs (Turner *op. cit.*). Currants (Tryon 1910). Bred occasionally from dried Turkey figs; dried Turkey figs, Brisbane 1911 det. MS (DPI): Jarvis (1913). Dried apples (Tryon 1915). Bee brood combs in hives and storage (Hacker *op. cit.*). Other records include: bred from dried peaches (1917 crop), Brisbane 1918 (DPI); tobacco seeds, Dimbulah 1933 det. MS (DPI); brood comb, honey comb, Brisbane 1940 (DPI).

Notes.—A. grisella is primarily a pest of beekeeping throughout Queensland. It is of minor status and is recorded usually in the warmer months from brood and pollen bee combs in hives that have died out or from such bee combs in storage (C. Roff, personal communication). Corbet and Tams (1943) report occasional infestations in dried insects: the record above from tobacco seed probably refers to scavenging, as specimens of *Corcyra cephalonica* with corresponding data have been seen. The earliest mention of *A. grisella* in Queensland concerns interception of an infestation in dried apples from California (Tryon 1900).

Corcyra cephalonica

Distribution.—Cosmopolitan (Richards and Herford 1930). NORTH QUEENSLAND: *Kuranda, Townsville* (Turner 1904); *Townsville* 1900 det. AJT (ANIC), Mar., May, Dec.; *Cairns* 1930 det. AJT (ANIC), Jan., Feb., Apr., May, Aug., Sept., Dec.; *Dimbulah* 1933 (DPI), Dec.; *Innisfail* 1942 (DPI), Jan., Feb., May; *Tully* 1942, Jan., Feb.; *Ingham* 1942 (DPI), Mar.; *Bowen, Charters Towers,* 1942 (DPI), Apr., Dec.; *Pentland* 1942 (DPI), Feb., Apr.; *Mareeba* 1942 (DPI), May, Dec.: SOUTH QUEENSLAND: *Brisbane* (Turner

op. cit.), 1903 AJT (ANIC), Apr., May, July, Dec.: CENTRAL QUEENSLAND: *Biloela* 1933 det. CIE (DPI); *Glenmore* 1939 (DPI), Aug.; *Mackay* 1942 (DPI), Mar.; *Rockhampton* 1962.

Recorded foods and habitats.—Larvae feeding in bodies of large moths from Thursday Island (Turner 1907). A major general pest of stored products particularly in the coastal and sub-coastal areas north of the Tropic of Capricorn (Caldwell 1947*b*). North Queensland: milled cereal products—of major importance; processed cereal products, factory and warehouse debris—of considerable importance; whole grains, crushed and cracked grains—of intermediate importance; leguminous seeds and seed products, nuts and nut meats—of minor importance; dried fruits and dried meats—of very minor inportance (Caldwell 1947*a*).

Records include: uncooked ham (Caldwell 1947*b*); flour, Cairns 1930 det. AJT (DPI), 1942, Bowen, Mackay, Townsville, 1942, Innisfail, Ingham, Pentland, 1942 (DPI); wholemeal flour, Cairns, Charters Towers, Ingham, Innisfail, Townsville, 1942, Mareeba, 1942 (DPI); bran, Bowen, Charters Towers, Tully, 1942 (DPI), Townsville 1942; pollard, Charters Towers, Innisfail, 1942; oatmeal, Cairns 1942 (DPI); wheat, Bowen, Townsville, 1942 (DPI); maize, cracked and whole, Bowen 1942 (DPI), Townsville 1943; pearl barley, Cairns 1942 (DPI), Innisfail, 1942; rice, Bowen 1942; rice sweepings, Innisfail 1942; split peas, Pentland 1942; coconut meal stock food, Townsville 1942; tobacco seeds, 1937 det. MS (DPI), Dimbulah 1933 (DPI); cotton seeds, Brisbane 1929 det. MS (DPI); cotton bolls, Biloela 1933 det. MS (DPI); cotton ginnery, Glenmore 1939 (DPI), Brisbane 1964; peanuts, Bowen 1942 (DPI), Rockhampton 1962 det. MS (Champ 1965); Brisbane 1964 det. IFBC (DPI); raisins, Charters Towers 1942 (DPI); cocoa beans ex Gold Coast (DPI).

Notes.—*C. cephalonica* is the major Lepidopterous storage pest of tropical Queensland. It is of minor importance in south Queensland, where *Cadra cautella* is the major species. The only parasite record is an association in habitat with *Nevorgilla canescens* (Gravenhorst) (Hymenoptera).

Tortricidae

Cydia pomonella

Distribution.—Wherever the apple is grown (Meyrick 1911) Tasmania 1857 (Veitch 1929b); Victoria (Meyrick 1882), South Australia 1883, New South Wales 1887 (Jarvis 1926). SOUTH QUEENSLAND 1889 (Jarvis *op. cit.*): *Stanthorpe* 1896 as *Carpocapsa pomonella* (Tryon 1896, 1898, 1901, 1903, 1906, 1910, etc.); *Toowoomba* 1901 (Tryon 1901; *Brisbane* 1961, Oct.; all apple growing areas in Queensland (Jarvis *op. cit.*).

Recorded hosts.—Apple, pear, quince, peach, nectarine, and plum; occurrence in the three latter fruits is rare (Jarvis *op. cit.*); tropical apple, Brisbane 1961. All early records refer to the apple. The pest status and control of *C. pomonella* are reported in Jarvis (*op. cit.,* 1933, 1935, 1937*a, b*), Jarvis and Watson (1928), Veitch (1929*b*), Veitch and Simmonds (1929), Ward (1938), Ward and Ross (1938), Ward and Groom (1940), Atherton (1941), Caldwell (1946*b,* 1947*c,* 1948), May (1948, 1949, 1950, 1952*b*), May and Bengston (1955, 1959), Bengston (1960, 1965).

Notes.—*C. pomonella,* first recorded from Queensland in 1889, appears to have become established between 1890 and 1900. Numerous interceptions in apples from Tasmania were reported (Tryon 1895, 1896, 1897, 1900) and records from Stanthorpe, the main apple growing area, commenced in 1896 (Tryon 1896, 1898, 1901, etc.). Parasites recorded from *C. pomonella* in Queensland are *Dibrachys cavus* (Walker), *Pseudomicromelus australia* (Girault), *Trichogramma minutum* Riley, *Goniozus antipodum* Westwood, *Stomatocerus pomonellae* Cameron and *Stomatocerus stomesi* (Hymenoptera).

Laspeyresia metallocosma

Distribution.—NORTH QUEENSLAND: *Cooktown,* Oct., as *Tortrix metallocosma* (Lower 1901), *Townsville,* Oct. (Meyrick 1911).

Recorded habitats.—Larvae feed in stems of *Loranthus* sp. (Loranthaceae) (Meyrick *op. cit.*). Ex imported cork oak seeds, 7.i.31, as *"Cydia metallocosma".*

Note.—There is a corresponding record of *Laspeyresia* sp.: "ex imported cork oak seeds, 7.i.31, coll. J. H. Smith", det. JDB, in DPI Collection.

Gelechiidae

Sitotroga cerealella

Distribution.—Cosmopolitan (Corbet and Tams 1943). Australia (Meyrick 1895). New South Wales as *Gelechia melanartha* (Lower 1900) = *S. cerealella* (Meyrick 1904). SOUTH QUEENSLAND (Tryon 1895, 1912, 1917, Jarvis 1913): *Roma* (Tryon 1898); *Brisbane* 1902 det. IFBC (ANIC), Feb. to June, Aug.; *Gatton* 1942 det. IFBC (ANIC), May; *Cooroy* 1963, Oct.: NORTH QUEENSLAND: *Townsville* 1930 det. IFBC (ANIC), Sept.; *Proserpine* 1931 (DPI), Aug.; *Mareeba* 1961 (DPI), June; *Parada* 1963 det. CIE, Nov.: CENTRAL QUEENSLAND: *Blenheim* 1931 (DPI), Oct.; *Biloela* 1945 det. IFBC (ANIC), Apr.

Recorded foods and habitats.—Grain sorghum, in the field and in storage (Sloan 1945*b*). Cereals, not an important pest (Caldwell 1947*b*). North Queensland, of minor importance in whole grains, factory and warehouse debris (Caldwell 1947*a*).

Records include: Maize in storage, Brisbane 1910, 1935, det JDB (DPI), Cooroy 1963; sorghum, Brisbane 1945 (DPI), 1961 (DPI), 1964 det. IFBC (DPI); sorghum heads, Parada 1963 det. CIE; mixed grain spillage, Kingaroy 1963; tobacco leaf in barrels ex U.S.A., 1957 det. JDB (DPI); caught on tomatoes, Mareeba 1961 (DPI); split peas, Brisbane 1947 (DPI).

Notes.—*S. cerealella* is a minor pest of stored cereals in Queensland. Alexander (1917) quotes the Government Entomologist, H. Tryon, as regarding *Gelechia cerealella* in wheat as the next most destructive species to *Calandra oryzae*. The pest status of *S. cerealella* has changed, however, as widely reported throughout the world, with the introduction of combine harvesters; it has now minimal importance in wheat. Infestations are reported in maize commonly, and sorghum occasionally. Parasites recorded are *Apanteles* sp. *Bracon hebetor* Say, *Habrocytus cerealella* Ashmead, *Anisopteromalus calandrae* (Howard) and *Brachymeria* sp. (Hymenoptera).

Phthorimaea operculella

Distribution.—Tasmania (Berthon 1855), New South Wales, Victoria, as *Lita solanella* (Meyrick 1880*a*); South Australia (Tepper 1882). SOUTH QUEENSLAND: *Toowoomba* (Tryon 1889); *Brisbane* (Tryon 1895); *Knapp's Creek, Ballandean* (Tryon 1896); *Allora, Wide Bay,* (Tryon 1897); *Coomera, Kilkivan, Texas, Westbrook* (Tryon 1898); *Boowoogum, Maryborough* (Tryon 1899); *Gatton* (Tryon 1900); *Roma, Strathpine* (Tryon 1907); *Albert River, Nambour, Warwick* (Tryon 1909); *Crows Nest* (Tryon 1911); *Inglewood,* (Tryon 1915); *Applethorpe* (Veitch 1929*a*): NORTH QUEENSLAND: *Bowen, Evelyn Scrub, Mossman* (Tryon 1909); *Herberton, Terrors Creek* (Tryon 1910); *Cairns, Lower Burdekin* (Jarvis 1913); *Port Douglas, Proserpine* (Tryon 1915): CENTRAL QUEENSLAND: *Rockhampton district* (T. Passlow, personal communication).

Recorded foods and habitats.—*P. operculella* is a major pest of foliage and tubers in the field and in storage of potatoes, (*Solanum tuberosum* L.) and of foliage of tobacco (*Nicotiana tabacum* L.) in the field wherever these crops are grown throughout the State. Pest status and control in potatoes are reported in Tryon (1889, 1911), Veitch (1929*c,* 1935), Veitch and Simmonds 1929, Smith (J. H.) (1944), Caldwell (1946*a*), Cannon (1947, 1948), Brimblecombe and Cannon (1949), May (1951, 1952*a,* 1959), Smith (W. A.) (1952*a,* 1959), May and Hooper (1958) and May and Heather (1958), and in tobacco, ? Lamb (1890, 1892), Smith (J. H.) 1931, 1933), Atherton (1936), Cannon (1946), Cannon and Caldwell (1946), Smith (W. A.)(1952*b,* 1953, 1954, 1955, 1957, 1961), Saunders (1959; 1660; 1962; 1963*a, b, c*), Saunders and Ettershank (1961), Smith and Saunders (1960, 1961), Davis (1963*a, b*), Davis and Saunders (1963*a, b*) and Champ and Shepherd (1965). *P. operculella is* also a minor pest of tomatoes (*Lycopersicon esculentum* Mill.) and egg plant *Solanum melongena* var. *esculentum* Nees; pest status and control are reported in Veitch and Simmonds (1929), Sloan (1941, 1945*a*), Smith (1957) and

Brimblecombe (1960) and in Davis (1964) respectively. Other cultivated Solanaceae attacked are cape gooseberry (*Physalis peruviana* L.) and *Capsicum* spp. "Weed" Solanaceae reported as hosts are *Solanum nigrum* L., *Datura metel* and *Physalis minima* L. var. *indica* (Atherton 1936).

Notes.—The locality records cover first reporting of *P. operculella* as a pest of potatoes and tobacco, and indicate that the species was well established through Queensland before adequate reporting began. Records have referred to various synonyms: *Lita solanella* (1895-1899, 1901); *Gelechia solanella* (1900, 1907, 1911, 1912); *Gelechia operculella* (1903); *Phthorimaea operculella* (1909, 1910, 1913, 1915, 1926-1945, 1962-1965); *Phorictemia operculella* (1917); and *Gnorimoschema operculella* (1945-1962). Parasites reported from Queensland are *Paralitomastix koehleri* (Blanchard), *Microchelonus* spp., *Apanteles* sp. nr. *plutellae* Kurdj. (Hymenoptera) and a nematode *Mermis* sp.

Brachyacma palpigera

Distribution.—Australia (Common 1963). QUEENSLAND (Meyrick 1925): SOUTH QUEENSLAND: *Brisbane* 1916 det. JDB, Oct.

Recorded foods.—Larva feeds within the seed pods of *Acacia* (Common *op. cit.*). Attacking velvet bean seed, Brisbane 1916 det. JDB.

Cosmopterygidae

Sathrobrota rileyi

Distribution.—Southern U.S.A., Mexico, Hawaii, Australia as *Pyroderces rileyi* (Walsingham) (Cotton and Good 1937). CENTRAL QUEENSLAND: *Dawson River* 1893, Apr. coll. G. Barnard, as *P. rileyi* (Durrant 1912, Hodges 1962).

Recorded habitat.—Bred from cotton bolls, one record (Durrant *op. cit.*).

Notes.—Subsequent records from Australia (Cotton and Good *op. cit.*) and Queensland (Corbet and Tams 1943) presumably refer to Durrant's record. No subsequent collections of *S. rileyi* from Queensland have been made but I.F.B. Common (personal communication) has recorded this species from cotton bolls in the Northern Territory. Hodges (1962) separated *S. badia* from *S. rileyi* but did not examine Barnard's material though retaining in part Durrant's *Pyroderces rileyi;* the occurrence of S. *rileyi* in Queensland needs confirmation.

Sathrobrota badia

Distribution.—U.S.A. (Hodges 1962). SOUTH QUEENSLAND: *Kalbar, Kingaroy,* 1964 det. IFBC (DPI), Apr.

Recorded foods and habitats.—Ex sorghum heads in the field, Kalbar 1964 det. IFBC (DPI); ex peanut waste, common on farms and in central storage, Kingaroy 1964 det. IFBC (DPI).

Note.—The association of *S. badia* with sorghum and peanuts differs from Hodges's (*op. cit.*) list of hosts, corresponding more closely with the list given for *S. rileyi* than that for *S. badia.*

Oecophoridae

Endrosis sarcitrella

Distribution.—Cosmopolitan (Corbet and Tams 1943). Australia, as *Endrosis lactealla* Schiff. (Meyrick 1895). SOUTH QUEENSLAND: *Toowoomba* 1920 det. IFBC (ANIC), Oct., Dec.

Note.—No data concerning foods and habitats are available for local collections.

Hofmannophila pseudospretella

Distribution.—Cosmopolitan as *Borkhausenia pseudospretella* Stainton (Richards and Herford 1930). New South Wales, Victoria, Tasmania, South Australia as *Oecophora pseudospretella* Stt. (Meyrick 1885); Australia, as *Acompsia pseudospretella* Stainton (Meyrick 1895). SOUTH QUEENSLAND: *Stanthorpe* 1914 det. IFBC (ANIC), Nov.; *Brisbane* 1942 det. TGC (ANIC), Aug.

Recorded food and habitat.—Bred from wool sample, Brisbane 1942.

Lyonetiidae

Erechthias caustophara

Distribution.—NORTH QUEENSLAND: *Kuranda,* Oct., *Townsville,* Sept. (Turner 1923): SOUTH QUEENSLAND: *Brisbane,* Apr., Nov. (Turner *op. cit.*); Brisbane 1964 det. IFBC (DPI), Apr.

Notes.—There is one record of *E. caustophara* from underground galleries of the Brisbane export wheat terminal on 3.iv.1964. Other members of this family are dried vegetable material feeders.

Hieroxestis omoscopa

Distribution.—New South Wales (Meyrick 1892). SOUTH QUEENSLAND: *Brisbane* 1964 det. IFBC (DPI), Apr.

Notes.—There is one record of *H. omoscopa* from underground galleries of the Brisbane export wheat terminal on 3.iv.1964. Meyrick (*op. cit.*) reported this species as sometimes common on fences near houses, and bred material from larvae feeding on sheets of cork.

Tineidae

Trichophaga tapetzella

Distribution.—Cosmopolitan (Corbet and Tams 1943). New South Wales, Victoria, Tasmania, as *Tinea tapetiella* Linnaeus (Meyrick 1892); Australia, as *Trichophaga tapetiella* Linnaeus (Meyrick 1895). SOUTH QUEENSLAND: *Brisbane* 1912 det. AJT (ANIC), Jan., Apr., June, Aug.

Note.—No data concerning food and habitats are available for local collections of this dried animal and vegetable matter feeder.

Monopis meliorella

Distribution.—New South Wales as *Tinea vivipara* Scott (Scott 1862). SOUTH AND CENTRAL QUEENSLAND: *Duaringa, Toowoomba, Brisbane,* June to Feb., as *Blabophanes meliorella* Walker (Meyrick 1892); Brisbane 1964 det. IFBC (DPI), Apr: NORTH QUEENSLAND: *Atherton,* 1963 det. CIE, Nov.

Note.—There is one record of *M. meliorella* from underground galleries of the Brisbane export wheat terminal on 3.iv.64.

Tineola bisselliella

Distribution.—Cosmopolitan (Corbet and Tams 1943). New South Wales, Tasmania, South Australia, West Australia (Meyrick 1892); Australia (Meyrick 1895): SOUTH QUEENSLAND: *Brisbane* 1902 det. AJT (ANIC), Jan. to Dec.; *Warwick* 1930 det. AJT (ANIC), Feb.: CENTRAL QUEENSLAND: *Rockhampton* 1926 det. AJT (ANIC), Aug.

Recorded food and habitat.—Wool, Brisbane 1941 det. CIE, 1941-44 (Key and Common 1959). These authors have described the seasonal abundance in a Brisbane wool store of *T. bisselliella* and its parasite *Apanteles carpatus* (Say).

Note.—The parasite *Chremylus elaphus* Haliday has been recorded associated with *T. bisselliella* in Brisbane as above.

Tinea pellionella

Distribution.—Europe and North Africa (Corbet and Tams 1943). New South Wales, South Australia, West Australia (Meyrick 1892). QUEENSLAND: *Brisbane* 1919 det. AJT (ANIC), June, July, Sept., Dec.

Recorded foods and habitats.—Wool, Brisbane 1941-44 (Key and Common 1959); these authors have described the seasonal abundance of *T. biselliella* in a Brisbane wool store. Clothing including woollen blankets, heavy felted woollen trousers and blue serge woollen bands of caps in navy victualling store, bristles of nail brushes (Weddell 1947).

Note.—*Apanteles carpatus* (Say) and *Chremylus elaphus* Haliday were associated with *T. pellionella* in Key and Common's record above.

Niditinea fuscipunctella

Distribution.—Cosmopolitan (Corbet and Tams 1943). Australia as *Tinea fuscipunctella* (Meyrick 1892, 1895). QUEENSLAND: *Brisbane, Toowoomba,* Aug. to Mar., June (Meyrick 1892); *Dalby* 1960 det. JDB. Sept.

Recorded habitats.—Common in houses and feeds on dry refuse (Meyrick 1892). Damp barley spillage, Dalby 1960 det. JDB.

Setomorpha rutella

Distribution.—Tropical and subtropical regions of the Old and New World (Corbet and Tams 1943). QUEENSLAND: *Brisbane* 1912 det. JDB (DPI), Feb., Apr., May, Sept., Oct., Dec.; *Kuranda* 1927 det. IFBC (ANIC), June; *Millaa* 1936 det. IFBC (ANIC), June.

Recorded foods and habitats.—Ex flour mill, Brisbane 1912 det. JDB (DPI); ex machinery in wheat storage, Pinkenba 1964 det. IFBC (DPI).

Lindera tessellatella

Distribution.—Australia, New Zealand, California and South America (Corbet and Tams 1943). QUEENSLAND: *Toowoomba* 1904 det. IFBC (ANIC), Jan., Mar., Apr.

Note.—No data concerning foods and habitats are available for local collections.

Eriocraniidae

Agathiphaga queenslandensis

Distribution.—SOUTH QUEENSLAND: *Como, Maryborough* (Dumbleton 1952).

Host.—Seed of *Agathis robusta* (Dumbleton *op. cit.*).

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