

# CLASSIFICATION AND CROSS INFESTATION OF COMMODITIES

The commodities reported to be infested by stored-product insects can be classified in 28 categories. Overall, the percentage of commodities in each category ranged from 0.3% (dried fruit products, dfp) to 15.1% (vegetable material, v) (Table 3.1). The commodities included in each category are listed in Table 3.2 and Table 3.3 gives the scientific names of plant species included in Table 3.2. A total of 1010 commodities have been reported to be infested by the 235 insect species pictured in this Atlas. Twelve insect species were associated with more than 75% or 21 of the commodity categories suggesting broad host ranges (Table 3.4). These insect species infest 79 to 232 commodities and are some of the most common and economically important.

Because of overlap, the categories listed in Tables 3.1 and 3.2 can be combined in different ways to identify a more general category of commodities most frequently infested by an insect species. For example, grain, nut, oilseed, pulse and seed are all seeds. Processed commodities of several plant parts might be combined to show that processed commodities are more suitable for a species than unprocessed commodities. The large number of records for North American *Trogoderma* spp. in the seed category is a result of extensive surveys designed to detect the khapra beetle (Strong and Okumura 1958, Strong et al. 1959, Okumura and Strong 1965). For some insect species, too few records are available to have a representative sample.

Cross infestation of commodities, the movement of insects from one commodity to another, may be a major

problem when using commodity-sampling and pest-interception records to determine which commodities are suitable for insect development, reproduction and population growth. Laboratory studies on the suitability of commodities are reviewed in Chapter 4. Adults of many species are very mobile. Many of the commodity sampling and pest-interception records may be a result of insects finding shelter in commodities that are unsuitable for their development, reproduction and population growth. In addition to adults, *Dermestes* spp. wander as mature larvae and often damage commodities which are unsuitable for larval development (Hinton 1945). *Tenebrio* spp. have been found to wander as mature larvae and have commonly been found in commodities on which they cannot develop (Cotton 1963). Some larvae of *Cryptolestes ferrugineus* (Smith 1972), nitidulids (Campbell 1989), pyralid moths (Cole and Cox 1981, Hagstrum and Sharp, Richards and Waloff 1946, Tsuji 1996), *Tribolium castaneum* (Hagstrum and Gilbert, Toews et al. 2005) and *Trogoderma granarium* (Burgess 1959, Nutting and Gerhardt 1964) leave feeding sites to find a pupation sites and some of these wandering larvae could contaminate commodities that are unsuitable for their development. The number of stored-product insect species with these wandering larvae is likely to be much larger than indicated by this list. Hagstrum and Subramanyam (2010) reported that mature larvae of 361 insect species in 59 families and 5 orders wander in search of a pupation site.