Chapter (non-refereed)

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27. TREES AND THE PHYTOPHAGOUS INSECTS DATA BANK

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There is much information in the literature and in unpublished sources on the food-plants of insects and *vice versa,* but these records are widely scattered. To increase the accessibility of this information, a computerised data bank is being assembled using an IBM 370/165 at the University of Cambridge. Records of insects in Britain and their food-plants in Britain or elsewhere are being abstracted from the literature, from the data of expert entomologists and museum collections, and are being processed. They are supported by full references, an indication of whether or not the insect is regarded as a pest, its broad geographical distribution in the British Isles and the part of the plant eaten. Insects and plants are arranged taxonomically using hierarchical codes to phylum, class, order and family taken from standard texts. Within families the arrangement is alphabetical. All names are checked against current check-lists, and the flexible system can accept records at any level from sub-species to phylum. Where appropriate, records of particular relationships are being qualified, eg 'unreliable' data from continental Europe, etc. The data bank also allows for the description of food chains which include parasites and predators, although this has not been fully implemented yet.

At present, the data bank holds information amounting to 7663 insect/food-plant records, and a few hundred insect/insect records. Some of these records are corroborative observations from different sources. There are entries for Heteroptera; Homoptera, Cercopidae, Delphacidae and some Cicadellidae; Hymenoptera, Symphyta and most families of Coleoptera: those for Thysanoptera, Hymenoptera Cynipidae, other families of Homoptera and the remaining Coleoptera will be entered shortly.

Trees generally have more species of insects associated with them than woody shrubs, perennial herbs and other plant groups (Lawton & Schöder, 1978). This is probably because of the more complicated structure of trees. With the introduction of exotic trees and shrubs in forest and amenity plantings, the insect fauna of the UK is being altered by the introduction of associated insects; also the feeding habits of native insects are likely to change with the availability of large plantations of exotic species (Strong *et al.,* 1977; Strong, 1979). It is hoped that the data bank will be a useful tool for collating and updating records in this complex field of work.

As an example of using the data bank, a very preliminary comparison can be made of the fauna of *Pinus,* a genus with a species native to Britain, and *Picea,* which is wholly introduced (Tables 41 & 42). At the generic level for the plants, the data bank records 105 insects for *Pinus* and 80 for *Picea* (at 31.3.1978). These records show that 26% of the species on *Pinus* are specific to that genus, while for *Picea* the corresponding figure is only 4%. The interpretation of this result is speculative until more data are available. However, it is thought that the stenophagous species, incidentally those more likely to be of conservation importance, occur on

TABLE 41 Food-plants of 53 species of phytophagous insect recorded on *Pinus sylvestris* (from the data bank records at 31.3.79)

Most specific	14	Insects restricted to *Pinus sylvestris*
	4	Insects of *P. sylvestris* occurring on other species of *Pinus*
	13	Insects of *P. sylvestris* occurring on *Picea* as well as on *Pinus*
	6	Insects of *P. sylvestris* occurring on a variable range of food-plants in the Pinaceae including *Pinus, Picea, Abies, Larix* and *Pseudotsuga*
	6	Insects of *P. sylvestris* occurring on Cupressaceae as well as on Pinaceae
	1	Insect of *P. sylvestris* occurring on Taxaceae as well as on Pinaceae
Least specific	9	Insects of *P. sylvestris* occurring on angiosperms as well as on gymnosperms

TABLE 42 Food-plants of 31 species of phytophagous insect recorded on *Picea abies*

Most specific	2	Insects restricted to *Picea abies* (NB no insects recorded on *Picea abies* as well as other species of *Picea*)
	7	Insects of *P. abies* occurring also on *Abies* (sub-fam. Abietoideae)
	1	Insect of *P. abies* occurring also on *Pseudotsuga* (Abietoideae)
	12	Insects of *P. abies* occurring on *Pinus* (Pinoideae) as well as on Abietoideae
	6	Insects of *P. abies* occurring on a variable range of food-plants in the Pinaceae, including *Pinus, Abies, Pseudotsuga, Larix* and *Cedrus*
Least specific	3	Insects of *Picea abies* occurring on angiosperms as well as on gymnosperms

Pinus in the relicts of the Caledonian forest. There is naturally no equivalent for *Picea.* Evolutionary relationships within the family Pinaceae could also be involved, for *Pinus* is thought to be monotypic of the sub-family Pinoideae, while *Picea* is in the sub-family Abietoideae together with *Abies, Pseudotsuga* and *Tsuga* (Engler, 1954). A more taxonomically isolated plant genus might be expected to have a more specific fauna. At the species level for the plants, there are data for species of *Pinus* and 2 of *Picea.* Of the phytophagous insects recorded on *P. sylvestris,* 14 species are without alternative hosts, 4 occur on other species of *Pinus* as well as on *P. sylvestris,* while 13 occur also on *Picea.* Nine are polyphagous to the extent that they also feed on Angiosperms. Of the phytophagous insects of *Picea abies,* 2 of the 31 species seem restricted to this host, not even occurring on other species of *Picea* (Table 42). None of the *P. abies* species have yet been recorded feeding on members of the Cupressaceae.

References

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