13.1 INTRODUCTION

Almost three-quarters of Britain's 59 resident butterflies regularly breed in woodland and about one-third are confined to this biotope through a large part of their British range. Most species breed in open woodland habitats such as rides, glades and clearings, where their larvae feed on herbs or grasses growing in the field layer. Relatively few species breed on shrubs and trees (Thomas, 1986; Warren and Fuller, 1990).

Although most British butterflies have declined over the last 150 years, the greatest losses have been among species that breed in the earliest successional stages of woods and grasslands (e.g. Heath et al., 1984). In woods, nearly all losses have been attributed to the decline in coppicing as the traditional form of woodland management. Moreover, the same species have often become extinct on nature reserves which were established partly to conserve them (Thomas, 1984). The plight of woodland butterflies has therefore aroused much concern amongst conservationists, particularly as butterflies are thought to be good indicators of other, less conspicuous insect groups (e.g. Warren and Key, 1991). Conservation efforts have tended to focus on restoring coppice regimes or on managing woodland rides and glades but, until recently, there have been few quantitative data on which to base conservation programmes.

The aim of this chapter is to review the autecological research to date that has been conducted on several woodland butterfly species, and to consider the implications for their survival and conservation. We also hope to highlight the considerable gaps that remain in our knowledge of these vital topics, and to identify some of the problems that may result from future changes in woodland management.

13.2 THE HABITAT REQUIREMENTS OF BUTTERFLIES IN WOODLANDS

Within woodland, butterflies breed in four broad categories of habitat: grassland, fresh woodland clearings, the shady interior of woods, and the
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woodland canopy (after Warren and Fuller, 1990). The vast majority of British species that regularly breed in woods use predominantly grassy areas, such as rides and permanent glades, and all but four of these require very open, sunny conditions with less than 20% direct shade (e.g. Warren and Fuller, 1990). The wood white (Leptidea sinapis) and ringlet (Aphantopus hyperantus) prefer lightly shaded conditions in grassland with 10–40% direct shade; and only the speckled wood (Pararge aegeria) and green-veined white (Pieris napi) can tolerate heavier shade up to 90% (Warren, 1985a).

The second category contains three species – (the pearl-bordered fritillary (Boloria euphrosyne), the high brown fritillary (Argynnis adippe) and the heath fritillary (Mellicta athalia)) that also breed on the ground flora, but generally avoid the permanent grassland within woods – being restricted, instead, to food-plants growing in the open, warm situations that are created briefly after coppicing or clearing. At least four of the open grassland species also thrive in newly cut woodland: the grizzled skipper (Pyrgus malvae), the Duke of Burgundy (Hamearis lucina), the small pearl-bordered fritillary (Boloria selene) and the dark-green fritillary (Argynnis aglaja). Only two woodland species breed in dappled shade within woodland interiors, the white admiral (Ladoga camilla) and the silver-washed fritillary (Argynnis paphia). The final category contains five species which are more or less confined to the canopy where they breed on tree species and feed on honeydew as adults.

13.3 THE RESPONSE OF BUTTERFLIES TO COPPICING

13.3.1 Population changes through the coppice cycle

There have been few studies of butterflies in coppice woodland and these involve only a small number of species. This paucity of data is partly due to the current rarity of actively coppiced woods where studies can be undertaken but also to the fact that the importance of coppicing to butterfly conservation has only recently been recognized.

The most comprehensive data available are for the nationally endangered heath fritillary, which is now confined to the Blean Woods complex in Kent, and a few sites in south-west England (Warren et al., 1984). In the Blean, it breeds solely on common cow-wheat, Melampyrum pratense, which is a common constituent of the ground flora of deciduous woodland on some acid soils (Figure 13.1). However, eggs are laid only on plants growing under large canopy gaps, shaded plants beneath closed canopies are never used (Warren, 1987a). As a result, heath fritillary population size is correlated not with the absolute number of cow-wheat plants in its woods, but with the abundance of plants growing in open, sunny situations.