

DISCUSSION

The presence of *S. jacksoni* in Western Nigeria is not altogether unexpected. The fauna of the West African savanna, especially west of the River Niger, tends to be remarkably uniform, and the type locality of the species (Wenchi) lies well within the Derived Savanna zone.

More intensive trapping may well turn up specimens of this mouse from Togo and Benin (Dahomey). It is noteworthy that two young Togo specimens in the British Museum which R. W. Hayman assigned to *S. caurinus* Thomas, are thought by Rosevear (*op. cit.*) to be immature forms of *S. jacksoni*.

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Summer Nest Sites of the Hazel Dormouse in North-Eastern France

Miejsca letnich gniazd orzesznicy w północno-wschodniej Francji

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Laar V. van, 1979: Summer nest sites of the Hazel dormouse in north-eastern France. Acta theriol., 24, 37: 517—521 [With 1 Fig.].

The sites of six summer nests of *Muscardinus avellanarius* (Linnaeus, 1758) found in north-eastern France are described. In the present cases *M. avellanarius* inhabits mesophilic vegetations which structurally form gradual transitions between woodland and pastures. Within this gradient the Hazel dormouse builds its nest in the boundary between mantle communities (*Rhamno-Prunetea*) and fringe communities (*Trifolio-Geranietea sanguinei*) or where such communities are connected by shroud layers (*Convolvuletalia sepium*).

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I. INTRODUCTION

The habitat of the Hazel dormouse, *Muscardinus avellanarius* (Linnaeus, 1758) has been described, in more or less detail, in several reports (Arwidsson, 1926; Bauer, 1960; van Laar, 1971; Schulze, 1973; Sidorowicz, 1959; Wachtendorf, 1951). These studies suggest that not only physiographic factors, floristic composition and physiognomy, but also structural aspects and the spatial pattern of vegetation play a key role in dormouse habitat selection. The spatial pattern of summer habitats in north-eastern France is studied in this paper. Observations were made during July in two localities:

a) Along the edge of the Forêt Communale de Vigy (Vigy, département Moselle).

b) Along the edges of the Bois le Ménil, near Servanceuil (Servance, département Haute Saône).

Nest locations were used as the starting point of habitat descriptions.

II. OBSERVATIONS

Six nests of *M. avellanarius* were found, one at the bottom of an eastward slope with loamy, wet soil, July 1—2, 1974 and five on a northwest facing slope with clayish, moist soil, July 28—31, 1976; July 11—16, 1977. Nests were found in the vegetation at levels of 22, 45, 50, 70, 80 and 120 cm above ground, respectively. In all cases the nest was inhabited by one dormouse only. Characteristic for all nest sites is their position in forest edges at places where subsoil water came to the surface of the slopes. Vegetation thereby was partly characterized by moist soil requiring plant species, especially in the neighbouring meadows. Further in all sites there was a gradual transition in vegetation pattern from forest to open field.

In the Forêt de Vigy the forest bordered on an abandoned pasture, in which groves of young trees had established. A thick cover of herbs and grasses grew between these trees. The vegetation gradient from forest to open meadow can be described as follows:

Forest, up to 20 m high, with *Quercus petraea*, *Fraxinus excelsior* and in the undergrowth *Corylus avellana*. High forest edge (4—6 m), with *Corylus avellana*, *Viburnum opulus* and *Salix* sp. Low forest edge (0—2 m), with *Corylus avellana*, *Ulmus* sp., *Alnus glutinosa*, *Prunus spinosa*, *Viburnum opulus* and *Cornus sanguinea*. Fringe with high rising herbs such as *Angelica sylvestris*, *Eupatorium cannabinum*, *Chamaenerion angustifolium*, *Filipendula ulmaria*, *Lythrum salicaria*, *Cirsium oleraceum*, *Rubus fruticosus* coll., *Carex* sp. and *Solanum dulcamara* and an undergrowth of *Mentha* sp. and *Potentilla anserina* (Fig. 1a).

In the Bois Le Ménil nests were situated at forest edges, groves and hedges, bordering on pastures which were either completely abandoned or regularly, but not excessively grazed. Vegetation gradients were as follows.

Nestsite 1 (Fig. 1b) was found near a 7 m wide hedge of *Fraxinus excelsior*, *Malus* sp. and *Corylus avellana* rising up to 20 m, with sparse undergrowth of *Rubus fruticosus* coll. The neighbouring meadow

was varied, rather dry (with *Deschampsia flexuosa*, *Sarothamnus scoparius*) or wet (with *Potentilla erecta*, *Galium sylvaticum* and tufts of *Polytrichum* sp.) with transitions to heather vegetation (*Calluna vulgaris* and *Erica tetralix*). Grassland and heather were in the corner of a pasture rarely visited by cattle. The transition between hedge and

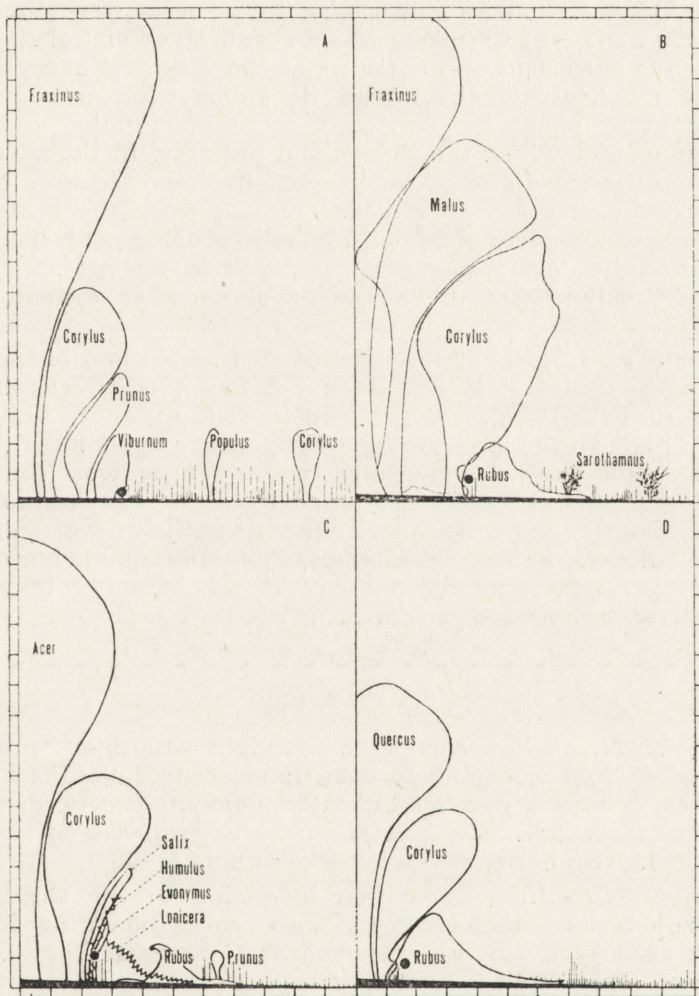


Fig. 1. Nesting sites (●) of *M. avellanarius* in the vegetation gradient from forest to open meadow. (a, b, d) at the boundary of mantle (*Corylus*, *Salix*, *Prunus*, *Viburnum*, *Evonymus*, *Rubus*) and fringe (*Rubus*, high rising herbs). (c) where mantle and fringe are connected by a shroud layer (*Lonicera*, *Humulus*).

grassland was a blackberry bush (*Rubus fruticosus* coll.; 3 m wide), the stems of which spread through both woods and grass. In this zone some *Teucrium scorodonia* and *Chamaenerion angustifolium* were found.

Nestsite 2 (Fig. 1c) was situated in a grove (100 m²) in the middle of

a meadow, close to site 1. This grove contained several *Acer pseudo-platanus* and *Corylus avellana* trees with a poorly developed herb layer (*Urtica dioica*, *Paris quadrifolia*), perhaps due to cattle trampling. A humid meadow with herbs such as *Stachys officinalis*, *Potentilla erecta* and, here and there *Thymus serpyllum* and *Galium verum* surrounded the grove. Along its northwestern edge three nests were found, where the boundary at two of the nests was a shrub layer of *Corylus avellana* and *Evonymus europaeus* and *Salix* sp. at the third. At every site bramble (*Rubus fruticosus* coll.) spread its stems over and through the shrubs and other plants. In two cases *Humulus lupulus* and *Lonicera periclymenum* intertwined the shrubs and bramble. In this zone *Stachys sylvatica* and *Urtica dioica* were present in one case and in another *Cirsium palustre* and *Juncus effusus* grew between the brambles. The vegetation was obviously affected by both grazing and trampling by cattle. Two of the dormouse nests were built in the bramble bush, the third on in the lianas, at the boundary of shrub layer and fringe of the grove (see Fig. 1c).

Nest-site 3 (Fig. 1d) was at the edge of an isolated and abandoned wet meadow in the Bois Le Ménéil. Here the forest edge was formed by *Quercus petraea* (ca 10 m), a *Corylus avellana* (5 m) and a bramble bush rising 2.5 m high. In the bramble zone *Euphorbia amygdaloides*, *Teucrium scorodonia*, *Epilobium montanum* and *Juncus effusus* were found. In the neighbouring grassland there was a fringe of tall herbs (*Cirsium palustre*, *Angelica sylvestris*) and other plants characteristic of wet soils such as *Alchemilla vulgaris*, *Lathyrus pratensis*, *Chrysanthemum leucanthemum* and *Caltha palustris*. The dormouse nest was situated in a bramble bush where this penetrated the forest.

III. DISCUSSION

All nests of *M. avellanarius* were found in situations where a gradual transition from woodland to open field occurred. In the analysis of natural forest fringes a number of major elements can be distinguished according to structural classification criteria (van Leeuwen, 1968; Müller, 1962; van der Maarel & Westhoff, 1964):

a) A »mantle«, with a vegetation belonging to the shrub class of *Rhamno-Prunetea*. Characteristic for these zones bounding forests and hedges, are usually thorny shrubs such as *Crataegus*, *Rosa* and *Rubus* species and further *Prunus spinosa*, *Corylus avellana*, *Evonymus europaeus*, *Salix* sp. These tend to close the higher wood from the open surroundings.

b) A „fringe“, with herb-like vegetation, structurally more related to the grassland vegetation. The woodland-fringe communities belong to the class of *Trifolia-Geranietea* (Müller 1962; Westhoff, 1968). Quite often however, they are built up from the nitrophilous growths of clearing communities, *Epilobieta*, and shroud layers, *Convolvuletalia* (van Leeuwen, 1968). These layers are vegetations consisting of climbing and winding species forming a shroud on the tall herbs of the fringe and the shrub (van der Maarel & Westhoff, 1964).

Thus the vegetations of forest edges are not a mixture of wood and grassland species but have their very own characteristic structure and species composition. It is typical for such communities that the diversity of both plant and animal species tends to be high. The causes of this special nature of these vegetations are to be found both in the abiotic environment, especially the steep gradients between high and low, dry and wet, or other extreme substrate factors, and in the processes of influences from outside. From human influences, such as the periodic cutting down of the trees and excessive cattle grazing, vague and hard-to-define contours and a fine grained pattern in the fringe vegetation result. The more this boundary environment takes its typical form, the larger the total linear extent of boundaries: the so-called divergent limit («limes divergens»). In this view, the botanical gradient is a reflection of a physiographic gradient and of the amount of temporal variation (van Leeuwen, 1966).

The habitat of *M. avellanarius* seems to be closely linked to «limes divergens». When this is instable in nature, as it is in fringe communities where forest clearance has taken place (*Epilobietea*) it is only temporarily inhabited by the Hazel dormouse. In maturing woodland succession these communities disappear and with them the dormice (c.f. Wachtendorf, 1951). Only through the influences of the repeated tree-felling or cattle grazing the stable communities of the divergent limit type come into existence in coppice and hedges and along forest edges. These communities can be stably inhabited by *M. avellanarius*, which builds its summer nests there where mantle and fringe border on each other or are intimately connected by a shroud layer.

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