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The colour patterns of diurnal *Meta menardi* (Latreille)

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I wish to draw attention to the unusual colour patterns and diurnal habits of young *Meta menardi* (Latreille) in the vicinity of Loch Sween in Argyll. The possible (though unlikely) uniqueness of this population was referred to in the preceding paper of this journal (Pennington, 1979). A fuller description of the study area will receive attention elsewhere.

This orb-web spider is generally regarded as a cave-dwelling species which also inhabits man-made 'caves' such as cellars and disused well-shafts. In the absence of more spacious light-free situations, however, the chosen web sites of adult *M. menardi* in this locality are scattered among many small underground chambers formed between large, partially buried rocks which are to a large extent roofed over by a thick carpet of *Luzula sylvatica* (Hudson) Gaudin on the steeper, more shaded oak-wooded shores of the loch. None of these 'microcaves' extends more than a few metres from the field layer, but even so, intermediate age classes of the population largely remain hidden from the observer on the surface. However, adult *M. menardi* can be observed at night just inside the narrow entrances of microcaves, particularly in May and June when the males actively court the females. They are shy of illumination by torch-light and they retire to the darkness of the microcave interiors during the hours of daylight.

When they leave their eggsacs in late April, 2nd instar *M. menardi* journey from the microcaves into the field layer itself (*Meta* species moult once in the eggsac and mature in the 7th instar). There they disperse widely, and spin webs and feed during the day for a period of 2-3 months, living alongside populations of *M. mengei* (Blackwall), *M. segmentata* (Clerk), and juvenile *M. merianae* (Scopoli). For a short time they outnumber these species. At the end of the 3rd instar they abruptly vanish from the field layer, returning to microcaves to complete development.

Larger instars and adults bear only faint brown dorsal markings, a series of forward-pointing chevrons which stand against the shiny black abdominal background, but during these first two free-living instars the juveniles carry distinctive, contrasty black and white dorsal patterns (Fig. 1). At the anterior hump of the abdomen two large black spots join in a trans-

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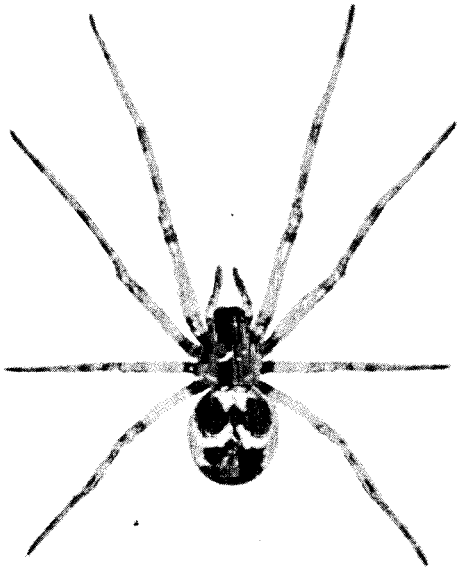

Fig. 1: A 3rd instar *Meta menardi*. The cephalothorax length of this instar is 1.04 mm.

verse dumbell or butterfly shape. This connects via a thin black median line to a series of transverse black bars which tend to coalesce as they taper towards the anal tubercle (the divisions between the bars are indistinct in the photograph). Both of these features, the butterfly shape and the series of bars, have homologues in the other three common European *Meta* species. The sternum and the lower sides and undersides of the abdomen are black, except for two conspicuous white spots, each of which lies, as seen from below, halfway between the mid-line and the side, and slightly more than halfway from the pedicel to the spinnerets. The annulated legs and most of the carapace are translucent-grey at this stage but at the moult from 3rd to 4th instars they darken through brown, the ventral spots vanish, and the white regions of the dorsal pattern turn first reddish-brown then black, leaving light regions only between the transverse bars. These fade with age and become the chevrons of the adult spider.

The abrupt change of colouration at the moult from 3rd to 4th instars and the switch from positive to negative phototaxis also occurred in a laboratory population of *M. menardi*. These spiders were collected from Argyll while in the 2nd instar and fed on *Drosophila* in a large clear plastic population cage built for observing the diurnal species *M. mengei* and *M. segmentata*. Since all the spiders were managed in the same way, being subject to the haphazard light/dark and temperature conditions of a University laboratory, I conclude that these changes are induced principally by an internal 'developmental clock' or growth monitor, rather than by seasonal changes in the field layer microclimate.

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