

HYPODRYAS INTERMEDIA MÉNÉTRIÈS IN EUROPE:  
AN ACCOUNT OF THE LIFE HISTORY

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The genus *Hypodryas*, part of the Euphydryine tribe, comprises four palaeartic and one nearctic species. A brief survey of the five members of this genus may demonstrate why, for various reasons, these are among the most interesting butterflies to be found in the Holarctic region.

The far north representative is *Hypodryas iduna* Dalman which occurs in damp areas with birch scrub, and south-facing hill slopes, in Arctic Russia and Scandinavia. It has a mysterious, discontinuous distribution because it is also found thousands of miles away from the Arctic in isolated areas in Asia — at around 1,800 metres, in the Altai and Sajana (ssp. *sajana* Bang-Haas); and even higher, at 2,700 metres, in the Caucasus — not inappropriately named ssp. *inexpectata* Sheljuzhko. The life history of *iduna* in the high Arctic is still imperfectly known, but larvae have been found in webs on *Veronica*, *Plantago*, and *Vaccinnium*, and are described, with a photograph of a pupa case, in Henriksen and Kreutzer (1982).

Flying well above the tree line in the western part of its range, *Hypodryas cynthia* D. and S., is a butterfly of the high Alps. In the Eastern Austrian and Bavarian Alps however it occurs below 1,000 metres in a larger brighter form. Further east in the Balkans and in Macedonia it once again flies at high levels. The male of this species is a vivid, distinctive insect, very active in sunlight, but the female resembles the other members of *Hypodryas*. The latter in point of fact, could be confused with *H. intermedia* in the field, but where their ranges overlap the two species are usually separated spatially by at least 300 metres difference in altitude. *Cynthia* occasionally strays to lower levels and it is not inconceivable therefore that the two could sometimes be found flying together. The early stages of *cynthia* have been described, but I do not know of any records of rearing *ab. ovo*. In the light of the latter part of this paper it would be most interesting to know if anyone has actually done this.

*Hypodryas gillettii* Barnes (type locality: Yellowstone, Wyoming), is the solitary New World member of the genus. A fascinating relict species, it occurs locally in damp meadows and light riparian woodland, from Yellowstone Park, Wyoming, through the mountains of Montana and Northern Idaho, to Alberta in Canada. Its food plant is a honeysuckle, twinberry (*Lonicera involucrata*).

Very similar in appearance are the two palaeartic species, *Hypodryas maturna* L. and *Hypodryas intermedia* Ménétériès. The former is a lowland butterfly of damp forest clearings. Always local, it is now rare in its western range, but perhaps still occurs in the

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woods east of Paris and in the Morvan, then eastwards through Lowland Europe, (including southern Fennoscandia), to the Altai mountains and Siberia. It has an intriguing life history; the females deposit on *Fraxinus* (ash), *Populus* species and perhaps *Lonicera*. The larvae feed on these *pabula* until the onset of winter, when they are said to make a hibernaculum among the leaves of the bush. This drops to the ground when the leaves fall and on emergence in the spring the young larvae commence feeding on various low growing plants such as plantain, Scabious and Veronica.

For many years *Hypodryas intermedia* was regarded as an Alpine sub-species of *Hypodryas maturna* as the two insects are strikingly similar. The genitalia differ however in minor but constant ways, and Higgins (1978) has pointed out the stability of these structures in each of the members of this group, in spite of their characteristic of localized colonies over a very wide range. *Hypodryas intermedia* has a remarkable disconnected distribution in the same fashion as *iduna*. It occurs in Korea and Kamchatka in the East, in the Altai and Sajan ranges in Mongolia and Asia. (one wonders if there is an overlap with *maturna* and *iduna* in the Altai) then, after an incredible gap of over 4,000 miles, *intermedia* has a narrow, localized distribution in the South Eastern Alps of Switzerland and Italy, just reaching Savoie in France.

This Western sub-species, *wolfensbergeri* Frey, the main subject of this paper, is perhaps most common in the Canton of Grisons in Switzerland and it was near Pontresina in early July 1979, in company with J. M. Chalmers-Hunt and T. W. Tolman, that I first encountered *intermedia*. The butterflies were found flying in sunny clearings within coniferous woodland, and also amongst *Alnus* scrub on sheltered hillsides near the upper limit of the trees. Colonies appeared mainly between 1,700 and 1,800 metres. The males flitted elusively around the bushes, occasionally settling on the sun-warmed rocks or bare ground. Only rarely were they seen feeding at flowers and then were invariably worn examples. Very few females were noted. One freshly emerged, was found by T. W. Tolman sitting in a small spruce tree. All sightings were between 11 a.m. and 3.15 p.m. (Swiss Time = BST).

Most text books on European butterflies either state that the life history and food plant of *intermedia* are unknown or else give hazy and conjectural information only.<sup>1</sup> Staudinger states however that *Hypodryas intermedia intermedia* larvae were found feeding on *Lonicera* at Vladivostock. This statement and also the fact that the closely related *H. gillettii* feeds on *Lonicera involucrata* in the American West, seemed to give a clue to the possible food plant of *H. intermedia wolfensbergeri* in Europe.

<sup>1</sup>Rappaz (1979) reports "*Lonicera*" for *intermedia wolfensbergeri* in the Valais. Verity (1950) gives a variety of foodplants which seem to apply more to *maturna* than *intermedia*.

The glades and the hill slopes in the Val Roseg, Pontresina, where we found *intermedia*, had abundant growths of a bushy type of *Lonicera* – *Lonicera caerulea*. This was the plant I started to search when I returned with T. W. Tolman and my two elder sons to Pontresina in mid August 1980. It was an incredible piece of good fortune that a group of Euphydryine larvae presented itself to me on one of the very first of these *Lonicera* bushes that I investigated. These larvae were very small, ca. 4 to 5 mm by ca. 0.5 mm, and were probably in their second instar. They had spun a thin web over the tip of the *Lonicera* leaf. A thorough search was made in other sites where *intermedia* had flown the previous year, but entirely without success. This particular glade was bounded on the north side by a steep rocky slope with scattered birch and alder, and on the south by a belt of larch and spruce. The ground cover was of *Solidago*, *Geranium*, and various grasses. Clumps of the aforementioned *Lonicera caerulea* formed rather straggly bushes among the rocks. The larvae themselves at this stage were light buff in colour, with darker brown spines, and rather indefinite lateral stripes of darker brown. They resembled rather pale, variegated examples of the larva of *Euphydryas aurinia* Rott. at the same stage, and moved in the same sort of jerky way over their web.

The leaf spray was removed, with the web intact, and placed in an air-tight plastic box. In an attempt to reduce condensation this was kept in a cool place in the dark until after our return to England a few days later. Notwithstanding the lack of sunlight the larvae fed freely throughout on the fresh leaves of *Lonicera* offered to them. On returning home I caged them with my usual arrangement of metal hoops covered with stretched nylon (ladies 'tights' material) over a flower pot containing the growing food plant. This plant of *Lonicera caerulea* was quite small and was soon eaten up, but to my relief the larvae readily accepted ordinary British *Lonicera periclymenum*. During the last few days of August the larvae moulted *en masse* on the surface of the web. The shed larval skins were left *in situ* and the batch of caterpillars migrated to another area of the plant. At this stage (third instar) they had darkened in colour. The buff-brown colour remained and was particularly obvious on the centre of the dorsum, but the spines and lateral markings had become blackish-brown. They measured 6 mm in length by 0.7 mm in diameter. They fed less and less, then suddenly on September 15th, all except two or three disappeared. A careful search showed that they had secreted themselves about 7 cm from the surface of the ground in a small collection of dead *Lonicera* leaves, the centre of which was bound together by fairly robust web through which the larvae could just be seen. They were kept outside under the shelter of a large birch tree throughout the winter and the first larvae emerged to sun themselves in mid January of the following year.



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There was a fairly high mortality at this stage. I estimated the original batch numbered about 50 to 60 examples and perhaps half of these died during the winter. Of the 30 or so that survived, some failed to feed and I brought two batches of six or seven individuals apiece inside during early February. These fed readily on *Lonicera periclymenum* and underwent ecdysis after three weeks, then entering the fourth instar. At this stage the larvae had started to look even more distinctive. The spines had become a glossy black, the dark stripes on either side of the dorsum and lateral parts<sup>c</sup> of the body were also blackish. Size: Approximately 9 mm by 1.5 mm.

They continued to feed indoors on honeysuckle and moulted again after another three weeks. The fifth instar caterpillar was a handsome black spiny creature, with bright yellow markings. Each segment on the dorsum had two yellow spots, then a black area, then posteriorly a large yellow mark. The black spines arose from a broad black line and below this there were rather duller yellow spots around the level of the spiracles. The forelegs were black whereas clasper and rear set of legs were purplish brown. Size: 15 mm by 2 mm. The batches of larvae brought inside reached this stage in late April and there were six in all.

After this fourth moult these six refused all food. Room temperature was increased slightly and they were exposed to as much sunlight as possible and even offered different food plants, such as plantain and scabious, as well as the two *Lonicera* species they had formerly fed on, all to no avail. As the temperature was increased they became more and more restless and eventually died.

The larvae that had been kept outside took until late May/early June to reach the same stage (fifth instar) and there were approximately 15 in this batch. To my despair these also fed in a very desultory way, if at all, after the fourth moult. They congregated in little groups of two or three in shady places, usually under dead leaves, or in folds of the netting, and gradually became more and more immobile in spite of the increasing heat and lengthening days of summer. This phenomenon occasionally happens when *Euphydryas aurinia* larvae are kept in crowded conditions after hibernation, and in these cases the larva remain until the Autumn in a state of diapause and then die. I had already tried forcing with notable lack of success, and there was certainly no problem with over-crowding. I therefore transferred the cage to a shadier place and left the remaining larvae to their own devices.

#### LEGEND TO FIGURES (OPPOSITE)

*Hypodryas intermedia* Men. Fig. 1, ♀, ex larva, Val Roseg, Pontresina. Fig. 2, 5th instar larva, just before 2nd diapause. Fig. 3, final instar larva. Fig. 4, final instar larva. Fig. 5, pupa. Photos. C. J. Luckens. Scale (approx.): Fig. 1, x 0.75. Fig. 2, x 3. Figs. 3, 4, x 1.75. Fig. 5, x 2.25.

Eventually all 15 sought out rolled-up beech leaves which I had hastily provided, and in twos and threes, settled down in these tube-like shelters which they partially sealed with silken strands. A single larva emerged in late August and recommenced feeding for a day or two, but then went once again to one of the leaf hideouts. The rest remained immobile throughout the summer and a brief look in November revealed at least 11 healthy looking larva.

Just before we moved house in late January 1982, I inspected the cage, which had been left out in the open throughout the cold winter of 1981/82. It was a cold but sunny day and somewhat to my surprise I saw that four larvae were out of their winter quarters and were sunning themselves on dead leaves. The small *Lonicera caerulea* plant was not in leaf, but I found some partially open leaf buds of *Lonicera periclymenum* and inserted these twigs in the earth of the pot, just in case the larvae were ready to feed. I did not see more than four larvae at any time after their second hibernation and after a very rainy spell in early February this number dwindled to two. Their appearances were very sporadic until late February, and I am not altogether sure whether or not they underwent a moult at this time. On March 1st I noticed the first signs of feeding – on the leaf buds of the native food plant. Both larvae fed regularly during the rest of March, and one, noticeably larger than the other, became immobile on the last day of the month, completing its moult on April 2nd. Thereafter this individual grew rapidly and quickly stripped the small plant of *Lonicera caerulea*. It was transferred to another cage with a large plant of *L. periclymenum*.

The full grown larva was approximately 34 to 35 mm in length by 4 to 5 mm in diameter. Along the side and back were black markings from which four rows of glossy spines emerged. Around the spiracles and along the dorsum the larva was marked with heavy golden dots and blotches. The claspers and hind legs were pale purplish brown and the forelegs black.

On April 20th one larva started spinning a pad of silk on the netting of the cage and by the next day had suspended for pupation. I was alarmed to see, that evening, that it appeared to have fallen from its silken pad, but the following day it apparently started the spinning process again (slightly to one side of the previous site), and this time suspended itself safely completing pupation on April 24th. The other smaller larva underwent its final moult on the same day and pupated on May 11th.

The pupa of *intermedia* is similar to that of *Euphydryas aurinia* but is longer and slightly greyer in appearance. It is whitish buff in colour with a line of black markings along the side, spotted black and orange on the abdominal segments. The wing cases are slightly paler and have a pattern of black markings somewhat heavier than that of *aurinia*. The first pupa showed signs of darkening on May 19th and emerged on May 22nd precisely four weeks after pupation.

The other had a much shorter period of pupation (ca 1½ weeks) emerging on May 29th. Both were females.

Two main points emerged from this experiment: (1) Though the larvae preferred their native *Lonicera caerulea* they would really eat *Lonicera periclymenum* at all stages of their development. (2) Persistence of biennial life cycle. In spite of the vagaries of its weather, Southern England has a generally warmer climate and a more protracted "growing season" than that of the sub Alpine levels that *intermedia* frequents.<sup>2</sup> In spite of these very different conditions compared to those of their natural habitat the larvae persisted in going into diapause after the 4th moult, even when daylight hours and warmth were increasing. Attempts to force development artificially resulted in death. This suggests a deeply ingrained biological habit of the two year life cycle.

In view of these findings it would be most interesting to compare the life cycle of *intermedia* with those of its congeners, *H. cynthia* and *H. iduna*; both of which are exposed to an even shorter "growing season". It would be surprising indeed, if these closely related species did not share this biennial habit also, and that is something I very much hope to investigate over the next few seasons.

The closely-related lowland *maturna* is of primary interest however. By good fortune my friend Harold Short was rearing *maturna* of German origin during the two years I was engaged on *intermedia*. I was able to compare the larvae and was struck by the great similarity between the two species. The larval markings seemed virtually identical in pattern although the warm, golden-yellow patches in *intermedia* were perhaps slightly brighter than the more lemon-yellow shade of *maturna*. These *maturna* larvae were also reared throughout on *Lonicera periclymenum*. It was interesting to hear that several of Harold Short's *maturna* went into diapause at around the fourth or fifth instar, in late spring, and refused further food. Unfortunately these particular examples all perished during their second winter. Short's supplier in Germany informed him that these *maturna* larvae occasionally survived a second hibernation, but when this did happen the imagines nearly always proved to be female. As *Hypodryas maturna* is becoming so scarce in Western Europe a thorough investigation into its ecology and life history would seem a priority.

<sup>2</sup>As far as I could ascertain from enquiries among the local people at Pontresina, Val Roseg is rarely free of snow before early May. Thus there are four clear months before the onset of autumn which the larvae could use for feeding after the first hibernation. After the second hibernation, the larvae again emerging from diapause after the snows melt in May, would have only 2½ to 3 months to feed up, pupate and produce imagines in July, which is the usual flight period of *intermedia* in this area. This, in fact was almost exactly the time pattern followed by the *intermedia* when reared in S. England.

### Summary

Probable second instar larvae of *H. intermedia* were found feeding on *Lonicera caerulea* in Eastern Switzerland in mid-August 1980. These were reared in Southern England, and took two years to reach the imaginal state; this biennial life cycle being maintained in spite of attempts at forcing. Larvae (at various stages) and pupa are described. Two female *intermedia* imagines were obtained.

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### References

- Barnaby, T., 1967. *European Alpine Flowers in Colour*. Nelson, London.
- Besnoist, G., 1970. Note sur l'abondance d'Euphydryas cynthia au Lac d'Allos. *Alexanor* VI: 319-320.
- Bourgogne, J. and de Lesse, H., 1952. Un Rhopalocere de plus à inscrire au Catalogue des lépidoptères de France: Euphydryas ichnea Bdv. (=intermedia Mén.). *Rev. Franc de Lépidopterologie* 1952:143-152.
- Bretherton, R. F. and de Worms, C. G. M., 1961. Pontresena 1960. *Ent. Rec.* 73: 44-48.
- Ehrlich, P. R. and A. M., 1961. *How to know the Butterflies*. Dubuque, Iowa.
- Ferris, C. and Brown, F. M., 1980. *Butterflies of the Rocky Mountain States*. University of Oklahoma Press. Norman.
- Grey-Wilson, C. and Blamey, M., 1979. *The Alpine Flowers of Britain and Europe*. Collins, London.
- Henriksen, H. J. and Kretzer, I. B., 1982. *The Butterflies of Scandinavia in Nature*. Skanderavisk Bogforlag, Odense.
- Higgins, L. G., 1950. A descriptive catalogue of the Palaearctic Euphydryas. *Trans. R. ent. Soc. Lond.* 101(12):437-489.
- Higgins, L. G. and Riley, N. D., 1970. *A Field Guide to the Butterflies of Britain and Europe*. Collins, London.
- Higgins, L. G., 1978. A Revision of the Genus Euphydryas, Scudd. (Lep., Nymphalidae). *Ent. Gaz.*, 29: 109-115.
- Howe, W. H. (Ed.), 1975. *The Butterflies of North America*. Doubleday & Co., New York.



- Luckens, C. J., 1980. Butterflies in Eastern Switzerland 1979. *Ent. Rec.*, **92**:103-108.
- Luckens, C. J., 1982. Butterflies in Eastern Switzerland 1980. *Ent. Rec.*, **94**: 173-174.
- Polunin, O., 1972. *The Concise Flowers of Europe*. O. U. P., London.
- Rappaz, R., 1979. *Les Papillons du Valais*. Imprimerie Pillet, Martigny.
- Verity, R., 1950. *La Farfalle diurne d'Italia*, IV. Firenze.
- Wheeler, G., 1903. *Butterflies of Switzerland and the Alps of Central Europe*. London.

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THE WHITE ADMIRAL: LADOGA CAMILLA L. NEW TO BRECONSHIRE. — Three White Admirals were recorded near Crickhowell last July, two of them at a spot beside the river Grwyne. Of these, one was noted by my daughter Sarah, on the 26th, and two by her and my wife on the morning of the 27th, one of which I was able to observe later that day and fully identify.

The third specimen was noted, on the 22nd, at a locality between Crickhowell and Llangynidr by the mother and sister of Mr. M. Porter the Breconshire Nature Trust's Botanical Recorder, who were able to provide conclusive proof of identity. — J. P. SANKEY-BARKER, Plas Llangatock, Crickhowell, Poweys NP8 1PA, 18.i.1985.

MYTHIMNA OBSOLETA HBN.: OBSCURE WAINSCOT AND CHILODES MARITIMUS TAUSCH.: SILKY WAINSCOT IN N. LANCs (V.C. 60) AND S. WESTMORLAND (V.C. 69) IN 1983-84. — At approx. 3.30 a.m. B.S.T. on June 21 1984 I boxed a male *Mythimna obsoleta* on my house wall near to the m.v. trap. The only other *M. obsoleta* I have taken was 27 years ago, at Skipwith Common, Yorkshire, where the late C. R. Haxby and myself were operating a m.v. light trap, and which constituted the first record of this species for Yorkshire. I can find no previous record of *obsoleta* for Cumbria, nor is it shown to occur so far north on the distribution map in Heath *et al.*, *Moths and Butterflies of Great Britain and Ireland*. I also took at Beetham a male *Chilodes maritimus* resting outside the light trap, in the early hours of July 9 1984. Two *C. maritimus* were caught in 1983 only two miles west of here (see *Ent. Rec.* **96**: 221) in N. Lancs (V.C.60), and one was found dead in 1982 at Leighton Moss, and later exhibited at the Lancs. & Cheshire Ent. & Nat. Hist. Soc. The N. Lancs specimens were all ab. *bipunctata* Haw., whereas the Beetham specimen is a typical male.

Despite continuous light trapping in these areas since 1970, with Rothamsted and other m.v. traps, neither of these two species have been recorded until recently. Mr. Ernest E. Emmett of Lancaster showed me a specimen of *M. obsoleta* which he took in N. Lancs SD47, also in 1984. — J. BRIGGS, 5 Deepdale Close, Slackhead, Beetham, nr. Milnthorpe, Cumbria LA7 7AY.