

DESCRIPTION OF A NEW FORM OF
ADALIA BIPUNCTATA WITH NOTES ON IT'S
INHERITANCE

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The 2-spot ladybird, *Adalia bipunctata*, is extremely variable with respect to the patterns of the pronotum and elytra. The pronotum is white with varying amounts of black. In the most extreme forms it may be completely black. The elytra are most commonly red with two black spots, but a huge range of pattern variants occur. Mader (1926-1937) has described and named over one hundred forms ranging from all red to all black. We here describe a new mutation to be named form *purpurea*. It is an unusual form for it varies from previously described forms in its ground colour rather than in its pattern. The inheritance of *f. purpurea* is also outlined.

Our initial description for *f. purpurea* is of a one month old individual. The pronotum appears entirely black. The elytra are of a deep purple colour, rather darker at the base of the elytra and paling slightly to burgundy red posteriorly. The only marks present are the two black spots of the typical form which show through the ground-colour. Otherwise, the form is morphologically similar to the nominate form of the 2-spot; the legs are black as is the ventral surface of the abdomen.

Difficulty in describing *f. purpurea* arises because the rate of lay-down of the purple ground colour is slow and somewhat variable. When newly emerged, the adult is pale yellow, and the lay-down of pigment during the first 24 hours of adult life is the same as that of *f. typica*. The first indication of abnormality is to be seen on the pronotum. The central posterior white marks begin to darken, and then the lateral white patches also begin to appear to contain a dusting of grey. 48 hours after emergence, all the white areas on the pronotum appear mid-grey. Three days after emergence the first signs of abnormality appear in the elytra. They begin to look slightly dirty, so that the normally bright orange-red colour seems somewhat dull. This is particularly apparent basally and along the centre line of the elytra. When one week old, the insect has a completely black pronotum. At this stage the elytra are quite obviously darkening, the colour being best described as a dull russet red. Lay-down of the darker pigment appears to be more rapid at the anterior end of the elytra than posteriorly, so that the apices of the elytra are paler than the bases, throughout. The darkening continues over the next two to three weeks. As the colour becomes darker the change in colour appears to become slower. This may

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simply be an artefact of the pigmentation system, for it is likely that further pigment lay-down would be less obvious in dark individuals than pale ones. Once the form described above for a one month old individual is attained, there seems to be little further change.

F. purpurea first occurred in an inbred stock, the parental stock being taken during the summer of 1983 in the grounds of Keele University in Staffordshire. A large mixed stock from Keele had been kept in a culture for ten generations. A single mating pair of typical 2-spots were isolated and these produced 127 progeny. All were typical. The progeny were allowed to mate and lay eggs to constitute a stock known as Y12. This stock was maintained for a further three generations. In this third generation a single *f. purpurea* was discovered. It was a female. She was separated from the rest of the Y12 stock, and proceeded to oviposit within 24 hours, indicating that she had already mated with a Y12 male. 31 progeny were reared from this female. All were typical. These progeny were maintained as a stock, and gave rise to 52 F₂ progeny of which 12 were *f. purpurea*, the remaining 40 being typical. One male and one female of the *f. purpurea* progeny were isolated. These mated and produced 9 progeny, all *f. purpurea*. The remaining progeny in this F₂ generation were split according to phenotype and maintained as separate stocks. The *f. purpurea* F₂ stock has subsequently bred true, producing only *f. purpurea* progeny. The typical F₂ stock has continued to segregate both typical and *f. purpurea* progeny, in approximately a five to one ratio. This is to be expected if about two thirds of the F₂ typicals carry the *f. purpurea* gene.

The results are consistent with the hypothesis that *f. purpurea* is inherited as a single autosomal recessive gene. The Y12 male, which the original *f. purpurea* mated with before being isolated, must have been heterozygous for the *purpurea* allele. We suspect that the *purpurea* allele has arisen in the Y12 stock by mutation. It seems unlikely, given the history of the stock in which it was first found, that it could have already been present in the genome of one of the original Y12 parents.

We have had some difficulty maintaining stocks of *f. purpurea*, due to a certain degree of inbreeding depression. This has manifested itself in the increasing proportion of eggs from both the *purpurea* F₂ and the typical F₂ stocks which have been inviable. To alleviate this problem we have crossed our remaining *f. purpurea* to a new stock of *f. typica* from Keele. Pairings between the progeny of these crosses produce 3:1 segregations of *f. typica* to *f. purpurea*. We intend to cross *f. purpurea* to other genetic forms of *A. bipunctata* such as *f. quadrimaculata* and *f. duodecempustulata* to see if the *purpurea* allele produces a change in the red areas of pattern in these other phenotypes.

References

Mader, L. (1926-1937) Evidenz der palaarktischen Coccinelliden und ihrer Abberationen, In Wort und Bild, I. *Epilachnini, Coccinellini, Synonychini*, XII + 412, 64 T., 15 fig. (1926-1934, Wein, Verein Naturbeobachter und Samml., 1935, *Ent. Anzeig.*, 15: 329-383, 1937, *Ent. Nachr. Bl.*: 384-412).



EARLY RECORDS OF EUPITHECIA TENUIATA HUBN. (SLENDER PUG) IN INVERNESS-SHIRE — Following my note on the occurrence of *E. tenuiata* in Inverness-shire (*Ent. Rec.* 98: 125) I received a letter from Mr. M. Harper informing me that he found this species commonly at Newtonmore in 1954. It seems, therefore, that *tenuiata* has been present in Inverness-shire for many years and that our record of August 1985 was not the first for the county.

Thanks are extended to Mr. Harper for bringing these records to my attention. ADRIAN M. RILEY, Entomology Department, Rothamsted Experimental Station, Harpenden, Herts., AL5 2JQ.

PSYCHE CASTA (PALLAS) (LEPIDOPTERA, PSYCHIDAE) — A PREDILECTION FOR GARAGE DOORS? — As a daily commuter I see a good deal of my garage door, a galvanized up-and-over door painted black but now after many years with algal deposits and other debris. Attached to it, also the concrete cross-member above and to a low overhanging wooden gable, can always be found about 30 or so cases of *Psyche casta*. I have not met with them on the main house, trees or fences in the garden, but one has appeared on a similar but new and shiny black door on another garage recently built and a search also yielded one on a low leaf of *Lamium album*. I cannot clearly remember if there were any cases on the wooden doors of the old garage which this new building replaced but I suspect there were. The garage doors face NW. and are shaded; the cases are by no means evenly distributed but mostly concentrated about 6-7 ft. above the ground but 7 were at about 3-4 ft.; all have the unattached end hanging downwards. According to the literature I have, the cases are often to be seen in large numbers on fences, posts, tree-trunks or even grass-stems (Ford, *Guide to the smaller British Lepidoptera.*: 41 (1949); Emmet, *Smaller moths of Essex*; 40 (1981); Hattenschwiler in Heath & Emmet, *Moths and Butterflies Gr. Brit. Ir.* 2: 144 (1985)). A hibernating specimen of *Limothrips cerealium* Haliday emerged from a case I detached in Dec. 1986 for study in an unsuccessful attempt to determine from exactly what it was composed. B. VERDCOURT, Spring Cottage, Kimbers Lane, Maidenhead, Berks., SL 6 2QP.