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COLOUR MUTATIONS IN THE MOLE, *TALPA EUROPAEA* LINNAEUS 1758[1]

O ODMIENNYM UBARWIENIU U KRETA, *TALPA EUROPAEA* LINNAEUS 1758[1]

In almost every work on the biology of moles mention is made of finding differently coloured specimens (Hauchecorne, 1923; 1927; Folitarek, 1932; Kuzyakin, 1935; Stein, 1950; 1958; Godfrey & Crowcroft, 1960 and others). Recently Husson & Heurn (1959) described 12 types of colour aberrations in the fur of the mole.

I found 1 specimen with a section of differently coloured fur out of a total of 1067 skins forming material collected between 1955—60. It was an ♂ juv. caught on June 11th 1956, weighing 66.8 g., with a light cream spot about 1 sq. cm. in the middle of the belly.

I was fortunate in obtaining excellent material, consisting of 51 specimens of mole skin with non-typical colouring, from the Cracow Furriery Works. The colour mutations were selected from about 50.000 skins collected in 1955, chiefly from northern Poland. It proved possible to form an idea of the period of origin of the given skin, from the character and distribution of moult stigmata.

I based my definition of the colour of these skins on the Ostwald colour scale, as elaborated by Ştreller (1939). Colour names were given according to Ridgway (Zimmermann, 1952), and the colour of the skins was defined by two persons working separately, their results being later compared and differing opinions jointly discussed and agreed.

The whole of the material was divided into the following groups:

1. Cream-coloured (3 ♀♀ and 4 ♂♂). Acc. to Husson & Heurn *"aberratio coloris cremea"*.

Skin no. 1 ♀, back and upper belly "Vinaceous Buff". The snout, part of fur round eyes and narrow band along the middle of the belly ± "Mikado Orange".

Skin. no. 2 ♀, fur "Light Ochraceous Buff — Orange Pink". The colour was more intensive near base of paws and under chin. The fur of this specimen was covered on the back and sides by patches of lighter hairs of "Pale Ochraceous Buff".

Skin no. 3, ♀, fur a colour between "Light Buff — Seashell Pink".

Skin no. 4, ♂, fur similar in colour at the base to no. 3, but the ends of the hairs were smoky, producing the shade termed "Verona Brown". Along the middle of the belly, from the urethra to the sternum, there was a narrow band of fur of "Apricot Orange" colour. This specimen had been in process of the autumn moult. The new hairs near the sacrum did not differ in colour from the old fur.

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Skin no. 5 ♂, identical in colour with the previous specimen, except that in the sacral region and near the base of the hind legs and on the sides there were scattered stigmata of lighter hair. Light spots surrounded the ear openings.

Skin no. 6 ♂, winter fur similar in colour to no. 4 and 5, but slightly less smoky. The base of the fur was cream-coloured. On the underside a narrow band along the middle of the belly and the area between the paws, the throat, whole snout and the region of the mouth were "Flame Scarlet — Mars Orange" in colour.

Skin no. 7 ♂, from the summer period had deeply smoky ends to the hairs which produced the "Mummy Brown" colour on the back. The fur was cream-coloured at the base.

Skins nos. 4—7 were allocated to the group termed by Husson & Heurn *"aberratio coloris sordida"*, and *„aberratio coloris nebulosa"*.

2. Tawny-coloured skins (3 ♂♂ and 3 ♀♀) — *"aberratio coloris murina"*. The colour of these skins was as follows: 2 ♀♀ had winter fur which was the typical grey colour (Drab). The snout, throat and fur between paws was a lighter creamy-grey. A further 2 ♂♂ had fur of "Benzo-Brown" colour. Skin no. 5 belonging to a ♀, was covered with summer fur of "Army Brown — Fuscosus" colour. In addition the fur had delicate spots of cream-coloured hair scattered over the underside of the body.

Skin no. 6 ♂, with summer fur was "Olive Brown — Brownish Olive" in colour.

3. Skins with light and dark tobacco colour (8 ♂♂ and 6 ♀♀) — *"aberratio coloris sepiacea"*.

All of the 6 skins of a light tobacco colour come within the colour between "Saccardo Umber — Brussels Brown" and "Brownish Olive — Bister". Of seven skins with dark tobacco colouring 6 belong within the scale between "Brownish Olive — Corab Brown" and "Clove Brown — Bone Brown". With skin no. 7 almost half of the fur, from the snout along the back to halfway along the belly, was "Bone Brown" in colour, while the remainder was "Chestnut Brown — Mummy Brown" in colour. One skin (♀) was covered with winter hair, 2 (♂ and ♀) were midway through the autumn moult, the remainder having summer fur. It was characteristic of these skins that the newly-growing hair was of the same colour as the old. Two specimens with light tobacco colour (among N = 461) were caught and described by Stein (1958).

4. Skins of dark colour varying from the natural (3 ♀♀, 1 ♂) — *"aberratio coloris innominabilis"* come within the scale between "Chaetura Black — Clove Brown". Two of them were covered with summer hair, while the third was midway through the autumn moult.

5. Variegated skins (6 ♂♂, 1 ♀). Husson & Heurn include within this group several aberrations depending on the distribution and size of the coloured spots. In my material skin no. 1, ♂, had summer hair, of a typical mouse colour, with darker diagonal stripes. The back was of the darker "Olive Brown" shade, while the upper belly was "Buffy Brown — Deep Grayish Olive". No. 2, ♂, had winter hair, the back is "Olive Brown", with a band of fur on the ventral side from the urethra to the sternum, of "Light

Ochraceous Buff". No. 3, ♀, had summer fur of "Olive Brown" spotted fairly abundantly with cream-coloured hair, particularly in the anterior half of the body. On the underside the density of the spots was considerably greater. Skins nos. 4 and 5, ♂♂, had summer hair of an identical colour pattern. The upper belly, head and body to halfway down the shoulder blades is of a typical colour. The remainder of the back, the sides of the belly and region round the tail to the base of the hind legs is of a typical mouse colour. This area was intersected by a line of fur of typical colour reaching from the sacral region to halfway along the back. Nos. 6 and 7, ♂♂, had fur similar to mouse colour and were in process of the autumn moult. One skin had patches of grey-beige fur on the sides of the belly, reaching to the fore paws. The place where the fur was moulting was covered by new hair similar in colour to the typical colour of moles. It would seem that this was a case of a transitory colour aberration, as the new hair growing in place of the moulted hair had a tendency to tawniness. Pitt (1952) [cit. after Godfrey & Crowcroft (1960)] records a similar fact in a young mole of a cream colour, in which the new hair growing where the old had moulted was of a typical colour. According to the classification introduced by Husson & Heurn (1959) skin no. 1 would belong to *"aberratio coloris ventromaculata"*, no. 3 to *"aberr. col. punctulata"*, nos. 4—7 to *"aberr. col. griseomaculata"*.

6. Skins of a silver colour (5 ♂♂ and 7 ♀♀ + 1 sex ind.). Hauchecorne (1927) refers to moles of this colour, but there is no mention in works by other authors of similar aberrations. Of the skins, 6 proved (4 ♂♂ and 2 ♀♀) to be covered with winter hair. The colour of the fur in all the specimens was silver and according to the Ostwald scale of greyness came between "e — i", and had a very vivid metallic sheen. One skin with winter fur (♀) was silvery at the base but the hairs had light tips of a creamy shade, especially on the head and snout, producing the effect of lightly powdered hair of a pale tawny shade. The actual end of the snout was covered with hairs of a creamy colour.

The material was collected more or less at random from a party of pelts intended for production. While cream mutations predominate numerically in the results given by other authors (Hauchecorne, 1927; Husson & Heurn, 1959), in my material the most numerous were the tobacco shades and the group of silver skins. With regard to frequency of occurrence of aberrant form, according to Folitarek (1932) one specimen of colour mutation in 2000 is encountered at the very most. According to Kuzyakin (1935) the figure is 1—2 specimens out of 1000, and according to Stein (1958) the number of aberrant forms in the mole is within the limits of 0.06%.

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APPLICATION OF AN ELECTRIC ANEMOMETER FOR INVESTIGATING THE VENTILATION OF MAMMALIAN BURROWS

ZASTOSOWANIE ANEMOMETRU ELEKTRYCZNEGO DO BADANIA PRZEPŁYWU POWIETRZA W NORACH SSAKÓW

Ecological investigations of subterranean habitats of animals, especially of mammals, form exceedingly interesting chapters of ecology. It is but lately that they have entered a stage of well-deserved development. This problem presents, from the technical point of view, many difficulties which can be partly overcome by the use of modern apparatus for measuring and registering. The introduction of a thermoelectric feeler into subterranean burrows renders possible a complex analysis of the microclimate of this milieu.

The problem of ventilation of the burrows of mammals living underground is one of the aspects of this question. As our preliminary experiments showed, the electric anemometer, manufactured by Günter Lange K.-G., Berlin, (German Democratic Republic) proved to be a most suitable instrument. Its technical data: sphere 0—0.5 m/sec. fed by a 6 V constant current, amperometer with a sphere of 1 mA, weighing 2.7 kg. (Fig. 1). Adaptation of this anemometer for investigation in underground conditions necessitated the construction of a special covering, for the feeler, thus insuring the thin platine wires against injuries caused by mounds of earth or plant roots. This covering, as to its dimensions, is identical with the original covering, but it has two windows, 4.0×5.5 cm. in size, which assure the flow of air. A wire net with large meshes was placed in the windows.

In our investigations we used an anemometer for measuring the ventilation in the burrows of a mole (*Talpa europaea* Linnaeus, 1758). It can be used for investigation in burrows at different depths, even up to 1 m. When introducing the sounding-rod of the anemometer into runs situated at a depth of 10 cm. we cut out, by means of a knife, a hole in the turf with a diameter corresponding to that of the head of the sounding-rod. We then removed the