

'ALBINO' WOODLICE : DO THEY EXIST?

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INTRODUCTION

Collins English Dictionary defines an albino as a 'person with congenital absence of pigmentation in the skin, eyes, and hair' or 'any animal or plant that is deficient in pigment'. The term is derived from the Latin albus meaning 'white'. The Penguin Dictionary of Biology extends the definition and describes albinism as 'Failure of development of skin pigments. In mammals, including man, commonly due to a single recessive gene.'

There are major selective pressures against the conservation of the gene which produces albinism. Humans with complete albinism are blind, although in this modern age, notwithstanding their blindness, albinos are able to lead an active normal life (Johnny Winters, the well-known West Coast electric guitarist of the 1960's and 1970's, famous for his lightening speed on the fretboard, springs to mind).

In animals, the major disadvantage conveyed by a lack of normal pigmentation, so the argument goes, is the reduction in camouflage. Albino vertebrates are soon 'picked off' by predators. Absence of colouration may also result in complete or partial albinos being shunned by the opposite sex. In invertebrates, however, I would like to put forward the argument that under certain circumstances, the evolution of albinism has been a distinct advantage in enabling some groups to colonise environments where a lack of pigmentation is beneficial. The examples I shall use to support this argument will be British woodlice.

FACTORS CONTROLLING THE COLOURS OF WOODLICE

The appearance of woodlice in natural light is due to a combination of factors. These include reflection of light waves from the surface and subsurface of the dorsal cuticle, and refraction of light through structures on and in the cuticle.

Differences in the colour of heavily pigmented species such Philoscia muscorum (which has 'yellow', 'green' and 'red' forms - see Plate 6 in Sutton, 1980) are due presumably to differences in the colour and arrangement of the pigments themselves. Others, such as the common littoral species Ligia oceanica, are able to change the shade of the cuticle by expanding or contracting melanophores in response to the darkness of its background. The surface of Porcellionides pruinosus has a plum-like 'bloom' due to the presence of millions of tiny spheres which reflect the light in an as yet undiscovered way

(Holdich 1984).

In contrast, the colour of some species may be due partially or wholly to reflection of light from structures under the cuticle. Androniscus dentiger, for example, which is normally a rich rose-red or pink in life (see Plate 1 in Sutton 1980) 'has a broad yellow median stripe, through which the dark-coloured gut contents are visible, giving the impression that there is also a dark dorso-median stripe' (Harding & Sutton 1985, the cover of which illustrates a photograph by Dick Jones of this striking woodlouse).

Refraction of light by the cuticle of woodlice has, as far as I am aware, been seen only in species affected by an iridovirus. Infected animals have a violet sheen produced by the interaction of light with the virus particles. Federici (1984) reported that Armadillidium vulgare, Cylisticus convexus, Porcellio dilatatus, Porcellio laevis, Porcellio scaber, Porcellionides pruinosus and Trachelipus rathkei have been observed to have the virus. To this list can be added four additional species collected by BISG members, Ligidium hypnorum (Arthur Chater, BISG Newsletter No. 24), Oniscus asellus and Trichoniscus pusillus (Arthur Chater again, BISG Newsletter No. 21), and Philoscia muscorum (Paul Whitehead, BISG Newsletter No. 24).

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Of course, all species of terrestrial isopods are white when they are released as juveniles from the brood pouch (although their eyes, if present, are usually pigmented). Indeed, the cuticle is so transparent that certain digestive processes can be observed directly through the dorsal cuticle (Hames & Hopkin 1989). The adult compliment of pigments accumulates as they mature. However, several species on the British list are completely, or almost completely, white as adults. These include the 'ant woodlouse' Platyarthrus hoffmanseggi, soil-dwelling species such as Trichoniscoides sarsi and the three species in the genus Haplophthalmus, and littoral species such as Miktoniscus patiencei and Trichoniscoides saeroeensis. Consequently, I would suggest that we reserve the term 'albino' for white individuals of a species which is normally heavily pigmented.

Under this definition, albino woodlice do exist. I collected a specimen of Porcellio scaber from Most Southerly Point on the Lizard in Cornwall in September 1983 which was completely white, including the ocelli in which there was no trace of pigment. I have also turned up completely white Oniscus asellus in a disused chalk quarry near Henley, Oxfordshire on a couple of occasions. In addition, Arthur Chater collected an albino specimen of Porcellionides cingendus on the BISG Field Meeting in North Devon in April 1989.

These isolated specimens suggest that the incidence of albinism in woodlice is very low. However, if white forms are subjected to greater predation, then the proportion of the population which possess this phenomenon may be much greater in

juveniles than in adults.

THE SELECTIVE ADVANTAGE OF ALBINISM

Now the speculative bit! It is generally accepted that there is a strong selective pressure for cave-dwelling and deep soil-dwelling animals to lose their colour because those individuals which do not expend energy on manufacturing and laying down pigments, have more energy to spend on growth and reproduction instead. Thus, a heavily-pigmented species in which a proportion of the population are white, may be 'preadapted' for the colonisation of permanently dark environments such as caves.

A possible example of this is Androniscus dentiger which occurs in a complete range of colours from pure white to deep rose-red. In my experience, the rose-red form is dominant in gardens and other moderately stable synanthropic sites. However in more 'difficult' habitats, the white form is much more prevalent. Collectors at the BISG Field Meeting in Manchester in April 1986, for example, turned up a large population of white Androniscus dentiger in the accumulated wind-blown dust and rubbish at the base of a flyover of one of the city's busiest motorways. Perhaps the white form has a greater propensity for exploratory migrations! The white form is certainly found frequently in caves (Harding & Sutton 1985).

More research is required on the subject of albinism in woodlice and I would be grateful to receive specimens of, or accounts of, poorly-pigmented woodlice which readers of Isopoda may have come across in the past.

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