ON HEREDITY OF TWO FORMS OF ALBINISM AND ON THE FITNESS OF ALBINOS IN THE TURKISH DESERT WOODLOUSE HEMILEPISTUS ELONGATUS BUDDE-LUND, 1885 (ISOPODA, ONISCIDEA)

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ABSTRACT

Two forms of albinism and one form of partial albinism were found in Hemilepistus elongatus. Both forms of albinism are caused by recessive alleles each at a single, unlinked locus. Wild-types grew faster than albinos during the first 30 days of life, whereas the probability of surviving this interval was almost identical. This form of albinism can be used for determining paternity in polyandrously mated females. Females of both colour morphs showed no significant differences concerning the variable "clutch size/dry weight". In a long-term experiment both morphs survived in a mixed population. The results are discussed in the light of advantages and disadvantages of albinism in various habitats.

ZUSAMMENFASSUNG


INTRODUCTION

Albinotic individuals are rare in animals not living in permanent dark, while cave populations often consist predominantly or exclusively of albinos (Koßwig,
Woodlice keep to this rule, although in many non-cavernicolous species albinos are found now and then under natural conditions (Brandt, 1871 in *Porcellio scaber* Latreille, 1804; Geiser, 1929 in *Armadillidium vulgare* (Latreille, 1804) and some other species). The frequency of albinism in cave populations points to albinism conveying benefits in cave living animals, possibly in form of saved pigment costs, whereas in animals that live at least temporarily overground, pigmentation is selected for. Some advantages and disadvantages of albinism can be investigated under controlled conditions in the laboratory, which corresponds to cave conditions, e.g., with regard to the absence of visually-hunting predators. Under laboratory conditions benefits in form of saved metabolic costs leading to increased fitness will turn out as well as disadvantages resulting in lowered fitness (apart from those costs revealing themselves only under natural conditions like the higher perceptibility to visually-hunting predators).

Genetic albinism in isopods is often a recessive trait. De Lattin (1939), for example, found a recessive albino form in *Oniscus asellus* Linnaeus, 1758. In *Porcellio laevis* Latreille, 1804, in contrast, he detected specimens being almost white due to a purely phenotypic modification. In *Venezillo evergladensis* Schultz, 1963, Johnson (1980) found partial albinos and full albinos, with each trait being recessive to the wild-type. Both forms of albinism lay on independent loci. The occurrence of other colour morphs in different Oniscidea, like red, tan, or marbled, was generally explained by simple modes of inheritance, whereby some of these colour morphs were recessive and others dominant to the wild-type (Johnson, 1976; Adamkewicz, 1969; Sassaman & Garthwaite, 1980; De Lattin, 1939).

In 1990, some albinotic individuals of *Hemilepistus elongatus* Budde-Lund, 1885 were found in one of the boxes used for breeding this woodlouse in our laboratory. In contrast to the brownish grey to nearly black coloured wild-type, the albinos did not show any pigmentation apart from the dark mandible tips (analogous to the description of Johnson (1980) of full albinos in *V. evergladensis*). This absence of pigmentation also characterises the vasa deferentia of albino males which, in contrast, are dark in wild-type males. Albino mancas, newly released from the marsupium, have white eyes. This distinguishes them from wild-type mancas which are only sparsely pigmented, and therefore are also nearly entirely white at “birth” (i.e., at release from the brood pouch), but have dark-red eyes. Thus, the albino genotype can already be determined at “birth”. A similar method of genotype determination has been found by Sassaman & Garthwaite (1980) in *Porcellio dilatatus* Brandt, 1833.