

NOTES AND COMMENTS

CONSTANCY OF POLYMORPHISM IN THREE POPULATIONS OF
THE TERRESTRIAL ISOPOD, *ARMADILLIDIUM VULGARE*

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POPULATIONS near Cambridge of the terrestrial isopod (woodlouse, pill bug), *Armadillidium vulgare* Latr., are polymorphic. The common type of male is black without markings and of female black or greyish with a series of white or yellow markings. The populations also contain red animals, and two types of females, C and D, in which pigment is restricted and which are due to single, dominant genes. Four populations were sampled extensively in the period 1939-46 (Howard, 1962; table 4) and it has been possible to sample three of these populations again in 1979-80; the fourth population had disappeared.

TABLE 1

Total animals scored and percentage of females in collections made in 1939-46 and 1979-80

Site of collections	1939-46 collections		1979-80 collections		χ^2	P
	Total animals	% ♀♀	Total animals	% ♀♀		
Four Went Ways	2475	71.8	529	84.0	33.3	<0.01
Wandlebury	578	54.8	528	57.8	0.01	>0.80
Beechwood Reserve	328	71.3	344	64.3	3.87	>0.05

Two sites, Four Went Ways and Beechwood Reserve, had at both collecting times a marked excess of females whereas the other site, Wandlebury, had a ratio of about 45 males:55 females both in 1939-46 and 1979-80 (table 1). Although there are difficulties in estimating the sex-ratio of *Armadillidium vulgare* populations because collections made in June and July may be influenced by males and non-pregnant females preferring a different micro-habitat to pregnant females (Howard, 1980), it is probable that the Beechwood Reserve population has a sex-ratio of about 33 males:67 females; for collections made earlier than 20 May the Four Went Ways population had a similar sex-ratio, 65 per cent of females (Howard, 1980). These populations with sex-ratios of about one male:two females occur because there are numerous thelygenic females which have broods consisting nearly entirely of females.

Two sites, Four Went Ways and Wandlebury, have about 5 per cent of red animals whereas at the third site, Beechwood Reserve, red animals are rare. On the other hand the frequencies of type C and type D females are much higher at this third site (table 2). At no site has there been a

TABLE 2

Frequencies of red animals and of type C and type D females in two series of collections, 1939-46 and 1979-80

Site of collections	Percentage red animals		Percentage of females of			
	1939-46	1979-80	Type C		Type D	
	1939-46	1979-80	1939-46	1979-80	1939-46	1979-80
Four Went Ways	5.0	5.7	1.9	3.1	4.8	4.4
Wandlebury	5.4	4.4	1.3	3.6	3.5	5.6
Beechwood Reserve	0.6	0.3	7.7	7.2	9.4	14.5

significant change in the frequencies of the rarer phenotypes in the 35 or so years between the two series of collections (table 3).

TABLE 3

χ^2 and *P* values for 2×2 contingency tables to compare 1939-46 and 1979-80 frequencies

Site of collections	Percentage red animals		Percentage of females of			
	χ^2	<i>P</i>	Type C		Type D	
	χ^2	<i>P</i>	χ^2	<i>P</i>	χ^2	<i>P</i>
Four Went Ways	0.39	>0.50	2.56	>0.10	1.67	>0.10
Wandlebury	0.60	>0.30	3.49	>0.05	1.60	>0.20
Beechwood Reserve	—*	—	0.03	>0.80	2.80	>0.05

* Not calculated as only 2 of 328 animals and 1 of 344 animals were red in 1939-46 and 1979-80 collections respectively

Other examples of polymorphic populations in which there has been no change in the frequencies of the different phenotypes over many years are known, especially for the genus *Cepaea* (snails). Goodhart (1956, 1958) reported stable phenotype frequencies over periods of 64, 47 and 42 years for several English and French colonies, and Currey and Cain (1968) showed a similarity between Iron Age and present-day samples. On the other hand Clarke and Murray (1962) found that the proportions of at least two phenotypes of *Cepaea nemoralis* had changed drastically and significantly between 1926 and 1959-60 and that the changes were almost certainly the result of natural selection. Similarly in the moth, *Panaxia dominula*, Sheppard and Cook (1962) found a big change (25-7.3 per cent) for one phenotype over a 10 year period. The relative stability of the *Armadillidium* populations are presumably due to selective forces not having changed in the past 35 years and it would appear, particularly for the Beechwood Reserve population, that in this period red has no selective advantage over the common black and greyish types.

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