SEASONAL VARIATION IN THE HUMIDITY REACTION OF WOODLICE, *ONISCUS ASELLUS* L. AND *PORCELLIO SCABER* LATR. (CRUSTACEA : ISOPODA)

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Reactions of two species of woodlice, *Oniscus asellus* L. and *Porcellio scaber* Latr., to humidity were studied in the laboratory during the different seasons throughout one year in the U.K. Both species showed marked rise in the intensity of their humidity responses during March (which in the U.K. corresponded with the appearance of rain in spring). Essentially similar responses were noticed during the same seasons next year. Woodlice go into hibernation during the cold months in the U.K. (November to March). Rains in March bring them out to activity and this was confirmed by the experimental studies in the laboratory. Relation of humidity to their ecology is thus confirmed.

The reactions of woodlice to humidity have been studied by many workers in the past. From their reports it is clear that distribution of woodlice on land is governed mainly by humidity.

There appears to be no published record regarding the seasonal variation in the reaction of these animals to humidity. The present study was, therefore, undertaken to elucidate this problem.

MATERIAL

The species used in this investigation were *Oniscus asellus* L. and *Porcellio scaber* Latr. Fresh adult animals were always used. To differentiate from the males, the females were marked with white paint. Woodlice were collected from time to time from the Epping forest and also other places near London.

METHODS

The reactions to humidity of *O. asellus* and *P. scaber* were studied by the method of Wigglesworth (1941), which was slightly modified by Cloudsley-Thompson (1951). A large petri dish (14 cm in diameter) was divided into two equal parts by a glass strip fastened by paraffin wax. One half of the dish was nearly filled with distilled water. In the other half there was a

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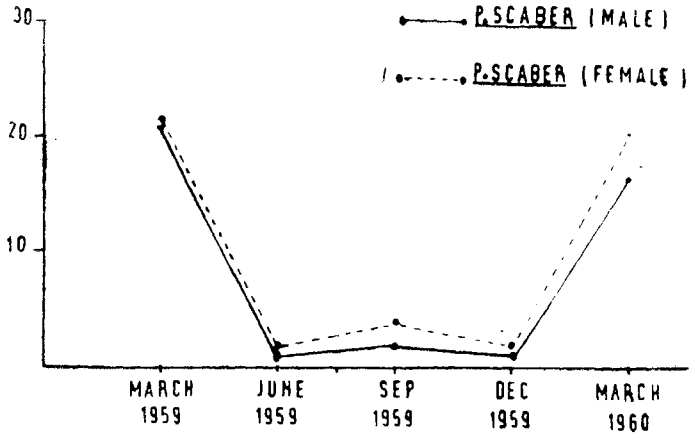
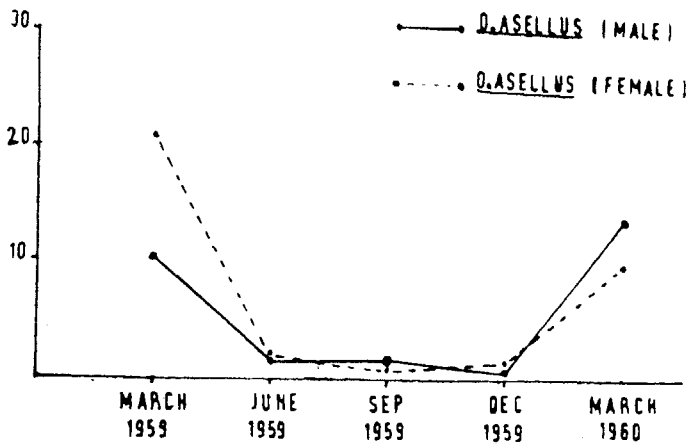
similar amount of sulphuric acid solution diluted to produce 50 per cent relative humidity (Buxton and Mellanby 1934). The petri dish was covered by fine copper gauze (16 cm in diameter). A metal ring (14 cm in diameter and 2 cm deep) divided into two halves by a metal strip, which just allowed room for the woodlice to crawl underneath, was placed on the copper gauze. The whole apparatus was kept in a dark place in order to preclude any influence of light. Relative humidity was measured by Solomon's method



TEXT-FIG. 1



TEXT-FIG. 2

(1957), and found to be 90 per cent on the wet side. The experiment was carried out at room temperature, 20±2° C. Five male and five female *O. asellus* were placed on the copper gauze. After an interval of fifteen minutes the positions of the animals on the two sides of the arena were recorded. After each reading the animals were thoroughly stirred with a piece of glass

rod. In this way an experiment consisting of five readings was carried out every third day throughout a month in each season. Thus ten experiments with 250 males and 250 females giving 500 position records were carried out in March, June, September and December respectively. A similar series of experiments was carried out with *P. scaber*. The total is summarized in Table 1 and in the graph (Text-fig. 1). The intensity of reaction was calculated by the method of Gunn (1937) as modified by Cloudsley-Thompson (1952). Similar experiments were carried out during the same periods next year. It was observed that the behaviour of these animals did not show any change at the identical months on those two successive years.

TABLE 1

Seasonal variation in the intensity of reaction to humidity of O. asellus *and* P. scaber

	O. asellus								*P. scaber*							
	Male				Female				Male				Female			
	W	D	C	M	W	D	C	M	W	D	C	M	W	D	C	M
March, 1959	149	3	7	91	155	6	2	87	112	7	7	124	107	3	4	136
Intensity of reaction		*21·8*				*22·3*				*10·5*				*21·8*		
June, 1959	59	22	12	157	90	21	7	132	136	36	20	58	151	34	6	59
Intensity of reaction		*2·3*				*3·8*				*3·2*				*4·2*		
Sept., 1959	91	20	8	131	107	13	2	128	108	29	9	104	88	41	15	106
Intensity of reaction		*3·9*				*7·7*				*3·3*				*2·0*		
Dec., 1959	49	18	28	155	54	11	14	171	50	21	39	140	78	32	19	121
Intensity of reaction		*2·0*				*3·4*				*1·7*				*2·1*		
March, 1960	137	7	3	103	163	6	4	77	99	4	4	143	130	5	8	107
Intensity of reaction		*17·4*				*20·6*				*17·2*				*14·9*		

W = wet; D = dry; C = centre; M = moving.

DISCUSSION

Although fully terrestrial in the sense of living on land and breeding without immersion in water, woodlice are ill equipped for terrestrial life. These animals are usually confined to regions of high humidity to prevent excess transpiration, to allow respiration and to regain water lost by excretion, defaecation, etc. Information about the movements of woodlice from

place to place, either seasonal or daily would be of great relevance. Unfortunately, such information is very scarce. Allee (1926) first showed experimentally that woodlice bunch together in unsaturated air. In winter most species are commonly supposed to migrate vertically (Collinge 1941). Fritsche (1934) found that *O. asellus* and *P. scaber* did not do so but rather moved laterally. None the less it remains a fact that these two species at least migrate into soil in winter though mode of migration may vary.

The experiments conducted in the laboratory show that both the species, *O. asellus* and *P. scaber*, are in a tendency to migrate towards higher humidity all throughout the year. But such tendency is maximum during March. In the field it is observed that these two species always prefer dampy situations but from November to the end of the fall they are not so easily available on the surface of the ground. This is perhaps due to the phenomenon of hibernation, which may be attributed to low atmospheric temperature and humidity. The occurrence in higher number of these two species in March is no doubt due to the higher surface temperature but increase in the intensity of reaction to humidity may be due to the setting in of rains.

The importance of humidity for the survival of these species has not only been found here, but similar results have also been obtained by other previous workers.

Acknowledgement

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