

On the Existence of Two Different Types of Striped Eyes among Solitary Type Specimens of the Desert Locust *Schistocerca gregaria* Forsk.

It was discovered in 1932 at the Locust Research Laboratory, Lyallpur, that there is a striking difference in the colouration of the compound eyes of the adults and hoppers of the two phases, *solitaria* and *gregaria*, of the Desert Locust. While in the *phasis gregaria* the eyes are uniformly claret coloured, those of the *solitaria* show a number of chocolate-coloured stripes alternating with cream-coloured interstripes.

The writer has worked out the histological basis of this difference and its probable physiological significance in the vision of the locust. Briefly, the findings were that whereas in the unstriped or "gregarious" eye, both the primary (distal) and secondary (proximal) pigment cells of an ommatidium are pigmented, in the striped or "solitary" eye such a condition obtains only in the ommatidia lying beneath the stripes. In the ommatidia lying beneath the interstripes the secondary pigment cells alone are pigmented. Other smaller differences also occur.*

An examination of a large number of specimens of the Desert Locust found in the breeding ground of Mekran (Baluchistan) and showing the solitary colouration, has shown that, while in the majority of cases the compound eyes have six stripes (and seven interstripes), in others seven clear stripes (and eight interstripes) are present. Thus any considerable collection of solitary locusts can be divided into two types, *viz.*,

Type I—with 6-striped eyes (Fig. 1).

Type II—with 7-striped eyes (Fig. 2).

In both the types, the second interstripe (IS^2) from the posterior side, is always broader than the rest and forms, so to speak, a landmark in the eye. It is found that whereas there is always a single stripe behind this interstripe, the number of stripes anterior to it may either be five or six, thus giving rise to the two types of eyes mentioned above.

An analysis of 727 locusts have shown (Table I) that the type with the 6-striped eyes is more common, forming 79.3% of the locusts examined. Since the number of stripes in the large number of specimens examined was invariably either six or seven the two types cannot be regarded as a case of simple variation. The origin of this

difference is, however, obscure. Whether the difference is inherited in a genetic way, can be shown only by extensive breeding experiments.

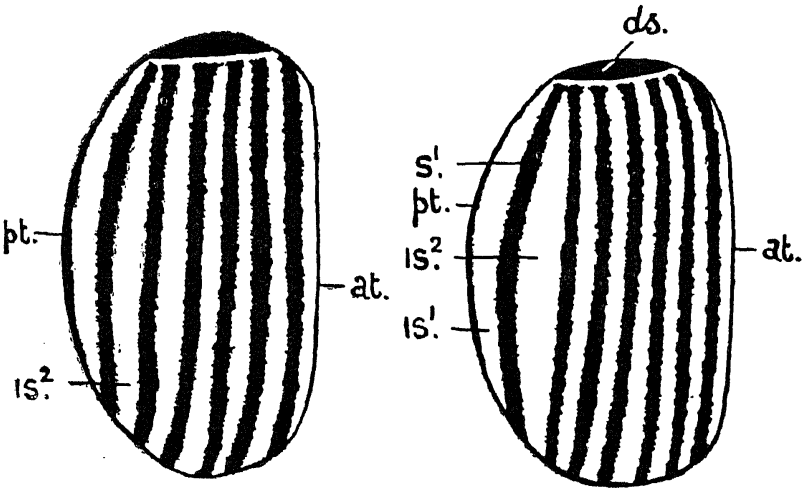


Fig. 1.

Fig. 2.

Fig. 1.—Side-view of the left eye of a female of *Schistocerca gregaria*, phase *solitaria*, showing 6 eye-stripes. X about 10. *at.*, anterior margin of eye; IS^2 , second interstripe from the posterior side; *pt.*, posterior margin of eye.

Fig. 2.—Side-view of the left eye of a female of *Schistocerca gregaria*, phase *solitaria*, showing 7 eye-stripes. X about 10. *at.*, anterior margin of eye; *ds.*, dorsal spot of eye; IS^1 , first interstripe from the posterior side; IS^2 , second interstripe from the posterior side; *pt.*, posterior margin of eye; S^1 , first stripe from the posterior side.

TABLE I.

Types of striped eyes	Sex	No. of specimens	Total No. in each type	Percentage in each type
Type I—with 6 stripes	♂	348	578	79.3
	♀	230		
Type II—with 7 stripes	♂	62	149	21.7
	♀	87		

It is proposed to make further observations in the course of the year as to the significance of this difference.

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* This investigation, as yet unpublished, was carried out during 1932-33 at the Locust Research Laboratory, Lyallpur, under the general direction of Mr. M. Afzal Hussain.