ERGOT SCLEROTIA ON *SORGHUM VULGARE* PERS.

THE incidence of the sugary disease of *Sorghum* caused by *Sphacelia sorghi* McRae in South India is observed almost annually in crops maturing in December-January. But in this province the sphacelial stage alone had been recorded so far. Ajrekar (1926) has described that sclerotia were formed but that they were overgrown with *Cerebella* and yeasts and that they did not germinate. Barger (1931) states that "a specimen of *Sorghum* in the herbarium of the Imperial Bureau of Mycology shows numerous slightly curved sclerotia, 10 to 12 mm. × 2 mm." Robertson (1928) reported long hard horn-like sclerotia on *Sorghum* from Burma.

In November 1946 heavy incidence of sugary disease of *Sorghum* was noticed in Koilkuntla, Kurnool District (Madras Province). Specimens of ears obtained from this area exhibited profuse sclerotial formation. Almost every other spikelet had one cylindrical, elongated or slightly curved sclerotium of cream to grey colour. These were 1 to 2·5 cm. long and 4 to 6 mm. thick and to all appearances resembled young sclerotia of ergot of rye. Some of these sclerotia were kept in moist sand at 5° C. for over one month and then removed to 20° C. But there was no sign of germination even after three months.

A cluster of 3 spikelets with sclerotia and a single sclerotium (× 1·25)

Surface sterilized sclerotia were cut into bits and kept on Kirchoff's medium. Mycelial growth developed and from this the fungus was multiplied. The growth of the fungus on Kirchoff's medium was white in colour with plenty of ærial hyphæ. But the rate of growth was very slow compared to that of ergot of rye. At laboratory temperature (26° C. – 28° C.) the growth was slower than at 20° C. – 23° C. Sporulation was evident in fifteen to twenty days. The conidia were of various shapes and sizes. Some were like the conidia found in nature. Others were smaller, oval or elongated and narrow. Transfers were made on sterilized young panicles of *Sorghum* and greater sporulation resulted on this substrate.

A suspension of the spores from the cultures was used for inoculation of young flowers of *Sorghum*. It was sprayed by an atomizer before the flowers opened, at the time of flower opening and after the anthers had all been shed. Successful infection was easily obtained in the first two stages, the highest incidence occurring when inoculation was carried out at the time of flower opening. At Coimbatore, however, only the 'honey-dew' stage developed. The sclerotium did not develop in any of the infected ears. Obviously a cooler climate is necessary for this, as the occurrence of the sclerotia has been observed only at higher latitudes.

The sclerotia were assayed following the method described by Mukerji and De (1944). There was not the slightest trace of the blue colour in the extract after the addition of the reagent indicating thereby that ergotoxine is not present in the sclerotia. Consequently ergot poisoning is not to be expected when cattle are allowed to eat ergotized ears of *Sorghum*.

Mycology Section, T. S. RAMAKRISHNAN.
Agri. Res. Institute,
Coimbatore,
June 25, 1948.

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A UNIQUE CASE OF ARTERIAL ABNORMALITY IN *RANA TIGRINA* DAUD.

ALTHOUGH numerous cases of abnormalities in the Venous System of the Anura have been recorded from time to time, very few instances affecting the aortic arches have been hitherto noted. Crawshay (1906)[1] described a female individual of *Bufo boreas*, in which there was a common systemico-pulmonary arch on the right side posterior to the origin of the large cutaneous artery. Sweet (1909)[2] found an abnormal connection between the internal carotid and the systemic in an individual of *Hyla aurea*, as well as two cases of the presence of accessory aortic arches in the same species. Benham (1919)[3] in *Hyla aurea*, and O'Donoghue (1933)[4] in *Rana temporaria*, recorded in certain cases the abnormal presence of four aortic arches instead of three. Mozejko (1919)[5] reported on the absence of the left pulmocutaneous arch in *Rana esculenta*, and

Young (1924)[6] on the absence of union between the two systemics in *Rana pipiens*. Avel (1929)[7] found that in a specimen of *Bufo vulgaris* the right subclavian artery arose from the pulmocutaneous arch at the point of its bifurcation, while in another specimen the cutaneous artery arose from the left aortic arch. O'Donoghue (1931)[8] recorded in *Rana temporaria* the absence of that portion of the right systemic arch which normally lies between the point of origin of the subclavian and the junction of the two systemics, and also discovered (1935)[8] an abnormal occipital artery arising from the systemic arch, as well as an

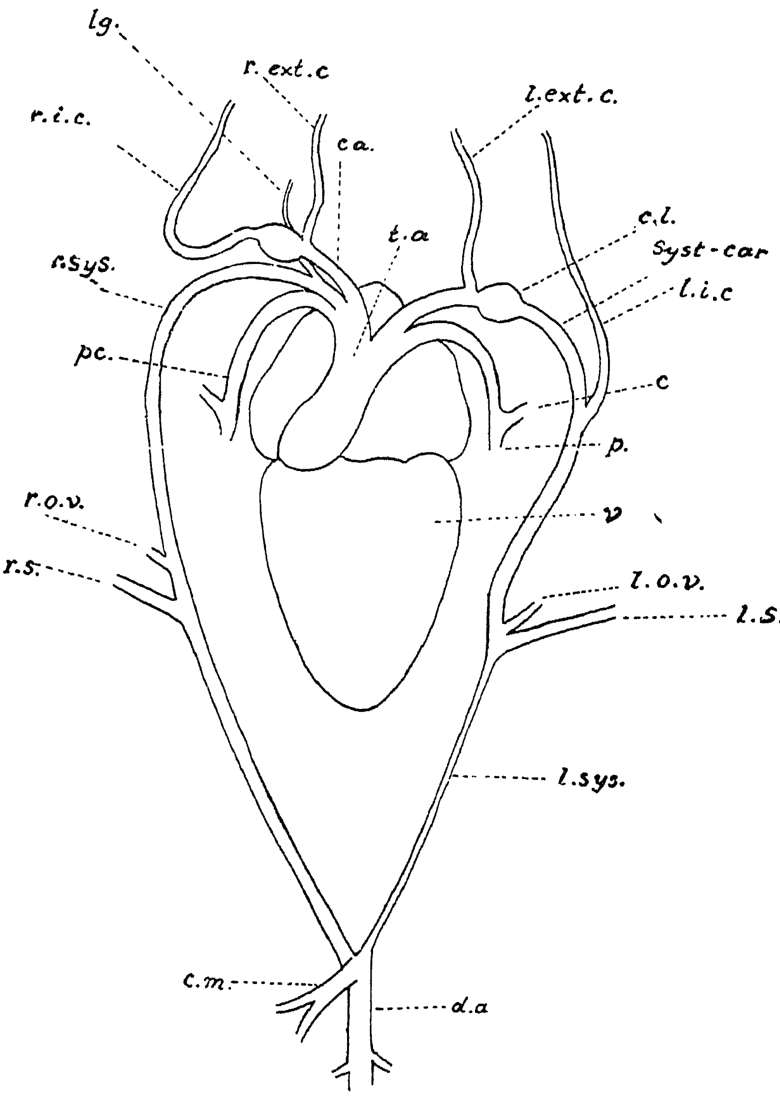

FIG. 1. Disposition of the main arteries in the abnormal specimen of *Rana tigrina*. *c*, cutaneous artery; *ca*, Carotid trunk; *c. l.*, Carotid labyrinth; *c. m.*, Cœliaco-mesenteric artery; *d. a.*, dorsal aorta; *l. ext. c.* left external carotid artery; *lg.*, laryngeal artery; *l.i.c.*, left internal carotid; *l. o. v.*, left occipito-vertebral artery; *l.s.*, left subclavian artery; *l.sys.*, left systemic arch; *p.*, pulmonary artery; *pc.*, pulmo-cutaneous trunk; *r. ext. c.*, right external carotid artery; *r.i.c.*, right internal carotid artery; *r. o. v.*, right occipito-vertebral artery; *r.s.*, right subclavian artery; *r. sys.*, right systemic arch; *syst-car.*, abnormal systemo-carotid trunk of the left side; *t.a.*, truncus arteriosus; *v.*, ventricle.

abnormal subclavian, in *Rana temporaria*; while Khatib (1938)[9] noticed a case of *Rana tigrina* in which two vessels arose close together from the right systemic arch at its origin, the inner one joining with the external carotid by a branch.

This year I came across a unique case of aortic abnormality in *Rana tigrina* Daud., which deserves mention. The individual was an adult male, and had been injected by me with carmine.

The arrangement of the arteries (Fig. 1) was normal on the right side, but on the left only two arches arose from the truncus arteriosus—a systemico-carotid arch and a pulmocutaneous one. The latter showed a normal distribution, but the former—the first case of a joint trunk of this type in the Anura—gave off the left external carotid artery a little way off from its point of origin, had a carotid labyrinth immediately distal to the origin of this artery, and passed from this point outwards, backwards, and upwards to assume a dorsal position. The left internal carotid artery arose not from the carotid labyrinth as is usual, but quite a way off from it from the conjoint systemico-carotid trunk near the dorsal region of the œsophagus. Thus, on account of its posterior origin, it was more elongated than the right one. After the origin of the left internal carotid, the arch passed obliquely backwards towards the median line and, after giving rise to the subclavian artery, became an extremely attenuated vessel, running backwards as the left systemic trunk to join its fellow of the other side. The presence of the injection mass inside showed that this attenuated section of the systemico-carotid trunk was a vessel, and not a ligamentous structure. There was no left laryngeal artery, and the occipito-vertebral and subclavian arteries, unlike those of the right side, arose from a common point from the left systemico-carotid trunk.

When we compare this abnormal disposition of arteries with the normal condition found in *Rana tigrina*, the deviation appears to be due to the fact that the carotid and systemic arches of this side are not separated from each other, but remain as a single undivided trunk a view which is supported by the absence of a partition separating the carotid and systemic channels from each other inside the conjoint vessel. The attenuation of the systemic artery posterior to the origin of the left subclavian may be correlated with the extremely small amount of blood left over to be transmitted from this side to the dorsal aorta.

The presence of a conjoint systemico-carotid arch in this case reminds one of the Reptilian condition where such an arch is present normally, although on the right side.

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RADHA KRISHNA KAUSHIK.
Department of Biology,
Birla College,
Pilani,
April 23, 1948.

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THE VASIFORM ORIFICE OF LARVAL ALEURODIDÆ

THE vasiform orifice constantly present in all Aleurodids, is one of the major characters on which the generic classification of the group is based. There has been a considerable difference of opinion regarding the morphology and function of the operculum and the lingula, which are invariably associated with the orifice (Fig. 1). Peal[1] considered the vasiform orifice as a special secreting structure and honey dew to be connected in some way with the circulation of the larva. Bemis[2] appears to have a somewhat similar idea about the lingula. According to her in some species, there are seen minute blunt tubes on the apex of the lingula, through which the fluid may be secreted. Tullgren[3] regarded the vasiform orifice as the anal opening. Quaintance and Baker[4] believed that the anus opened below the lingula, which therefore, functioned as the supra-anal plate, the operculum being the rolled back edge of the lingula. Hargreaves[5] showed that the anus opened above and not below the lingula.

My studies on the fourth instar larva of *Dialeurodes eugeniæ* Maskell clearly show that

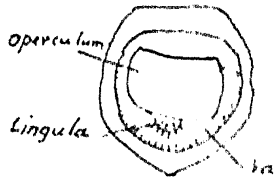

FIG. 1. Dorsal view vasiform orifice

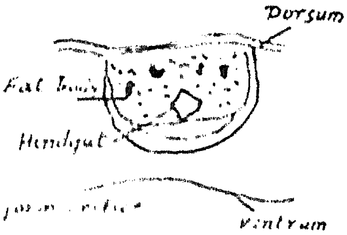

FIG. 2. T. S. through vasiform orifice

the vasiform orifice is a shallow depression of the dorsum, lodging the operculum and the lingula within (Fig. 2). Both the operculum and the lingula are hollow, containing extensions of the haemocœle. Therefore they should be regarded as abbreviated abdominal segments of the larva. The structures regarded as tubes by Bemis are merely cuticular spines. The posterior part of the hindgut traverses through the operculum and terminates into the anus above the anterior end of the lingula. The operculum is provided with muscles and by its forceful movement against the lingula squirts out the liquid faecal matter in the form of a droplet, at some distance from the body of the larva. The elongated and setose form of the lingula appears to guide the outward flow of the faecal drop. The pit of the orifice probably enhances the free movement of the operculum and the lingula enabling the larva to jet out faecal drops in several directions. In short, the three structures form a mechanism for the proper defeciation of the larva. A full account of the larval anatomy will be published elsewhere.

Robertson College, KARAM SINGH.
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