

SOME OBSERVATIONS ON SPHACELIA Spp. OCCURRING IN COIMBATORE

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Sphacelia represents the imperfect stage of the well known ergot fungus (*Claviceps spp.*). One species, *Claviceps purpurea*, invariably attacks rye grains and occasionally wheat and rye grasses (*Lolium spp.*) replacing the normal grain by a dark elongated sclerotium. This sclerotium is known as the ergot and though used in medicine is poisonous to both man and cattle. There are several species of *Claviceps* recorded on different grasses and *Juncus spp.* from Europe and America. The sphacelial stage has been observed on sorghum in several parts of India and Africa, on *Pennisetum typhoides* in Tanganyika, on *Andropogon caricosus* var. *molicomus*, *A. annulatus*, *Pennisetum alopecuroides* and *Ischaemum pilosum* in the Bombay Presidency. Ergot sclerotia were noted on *Pennisetum alopecuroides* in India. The following are some of the observations made on Sphacelia affecting sorghum and *Panicum ramosum* in Coimbatore.

On sorghum the fungus causes what is commonly known as the 'sugary disease'. Ajrekar has recorded this from different parts of the Bombay Presidency, but the observations were confined to the black soil tracts. In Madras it has been observed in and around Coimbatore almost every year during the months of November and December, more of the disease being noticed in the latter month. It has been recorded from Koilpatti also but no attempt has been made to find out its distribution. The disease is more in the later sown crops.

The infection is said to be mostly in the flower stage and that when once the grains have passed the milk stage no further spread of the disease occurs. This is borne out by field observations also. The cold weather crop is often in the vulnerable stage during November or December depending on the time of sowing, the later the sowing the greater the disease. Even in early sown crops sometimes branches are produced which bear heads. These being later formed show more of the disease than the main heads. The disease is sometimes observed in January also when the crop is retained in the field and side branches bearing panicles are developed. The disease rarely occurs in the summer crop. Most of the varieties are affected. In all cases increased humidity and heavy rains favour the appearance and spread of the disease.

It is characterised by the formation of a big pearly turbid drop of sticky fluid, sweet to the taste and held between the outer glumes of the spikelets, here and there in the panicle. These fall on the leaves

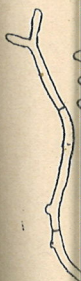
and the soil causing a number of white spots on the ground all round the plant. The drops contain large numbers of conidia. The ovary alone appears to be infected and this is enveloped in a whitish mass of fungal hyphae which penetrate into the tissues also. When an infected panicle is dried, the diseased spikelets show a whitish oblong body between the glumes which on dissection is found to consist of a mass of hyphae and the surface is thrown into a number of ridges and furrows with closely packed conidiophores. The inner portion is of a honey coloured semisolid consistency. The dried up anthers and styles often project from the apex. In moist weather other fungi overgrow this whitish mass. No regular sclerotia as in *Claviceps* have been found in sorghum.

The conidia are hyaline, oblong or oval with rounded ends and produced in very large members, the drop of liquid formed in the spikelet being a highly concentrated suspension of spores. These germinate readily in water, the process starting in the course of four hours under laboratory conditions. By the next day secondary conidia are formed one from each conidium. The germ tube is given off from the extremities or the sides; and at its end an oval secondary conidium is produced. Ajrekar was not able to get secondary conidia but in Coimbatore these are formed readily. The spores were placed for germination in drops of water on slides. Those along the margin and those floating alone germinated; while others which were submerged did not germinate at all, probably due to lack of oxygen. Beyond the formation of secondary conidia further growth did not take place. The spores were plated in Richard's agar. The submerged spores did not germinate and no growth formation was noticeable. Spores were transferred to the sides of agar slants in test-tubes. In these the germination of the spores and formation of secondary conidia could be observed but further growth did not take place.

During November 1932 some plants of *Panicum ramosum* in the Millets Breeding Station showed a similar sugary disease. Here too whitish drops of a sticky sweet fluid were noticed protruding from several of the spikelets in the panicle and these contained numerous spores.

The drops dry up quickly when the panicles are cut and brought to the laboratory and form whitish crusts in and over the spikelets. The glumes are unaffected. The ovary is more or less replaced by a whitish mass projecting from between the fourth glume and its palea and a portion of this is spread over the other glumes also. The conidia are quite different in shape from those of the sorghum fungus. They are hyaline, falcate or sickle-shaped with more or less pointed ends, one-celled and measure $19.8 \times 5.8 \mu$ the range being $14.6 - 29.2 \times 4.4 - 7.3 \mu$.

They germinate readily in water and in 15 hours, long germ tubes with several short branches are formed. Such branches are not



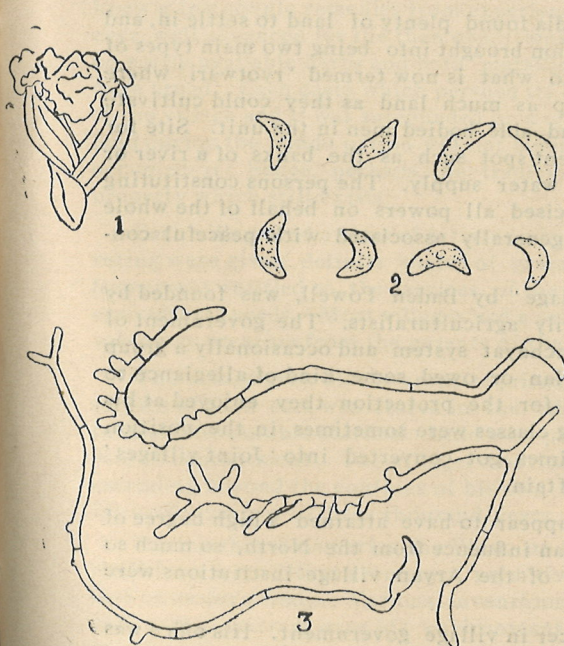
noticed in the sorghum fungus. Secondary conidia are developed at the apices of the germ tubes in some cases, one on each germ tube. The behaviour of the fungus on solid media is similar to that of the fungus on sorghum.

The species of *Sphacelia* found on *Panicum ramosum* appears to be different from *Sphacelia Sorghi* McRae on sorghum. Ajrekar states that the spores of *Sphacelia* on *Ischaemum pilosum* were slightly curved, but in the absence of sketches and other details it is not possible to say whether the spores on *P. ramosum* resemble those recorded by Ajrekar. It was not possible to continue the observations on this host since its cultivation was given up at the Millets Breeding Station. So far as the author knows this is the first record of the fungus on this host.

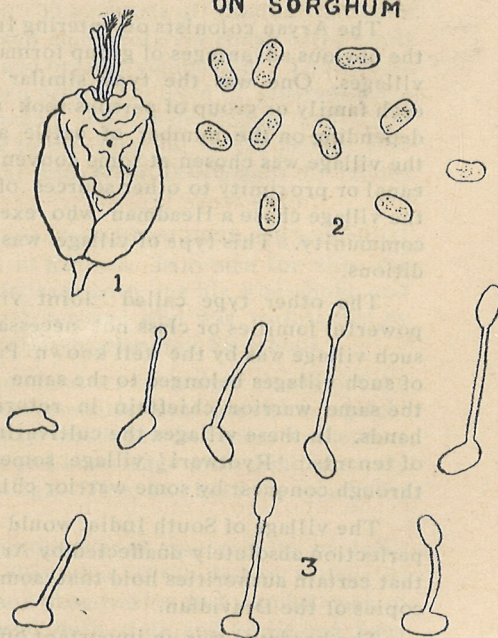
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ON PANICUM RAMOSUM



ON SORGHUM



Explanation of diagrams.

1. Diseased spikelet (dry).
2. Conidia ($\times 450$).
3. Germinating conidia.