

The condensation of sulphanilamide with 2-methoxy-6:9-dichloro acridine has already been reported.⁵ Acridine derivatives of other amino-thiazoles and amino-thiodiazines are being prepared.

The detailed experiments and the results of their action against malaria and bacterial infections will be reported elsewhere.

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March 26, 1940.

¹ Mietsch and Mauss, *Klin. wchschr.*, 1933, No. 33, 12760.

² Magidson and Grigorowsky, *Ber.*, 1936, 69, 396.

³ Magidson *et al.*, *Chem. Pharmaz. Ind.* (U.S.S.R.) 1935, No. 1.

⁴ Bose and Nandi, *Jour. Ind. Chem. Soc.*, 1930, 7, 961.

⁵ Ganapathi and Nandi, *Curr. Sci.*, 1940, 9, 67.

Pongamol, A New Crystalline Compound from Pongamia Oil

CRUDE karanjin extracted from the pongamia oil with alcohol¹ gave certain prominent colour reactions which were not produced by the purified compound. With concentrated sulphuric acid it gave a yellow solution which turned emerald green in the course of five minutes and when a drop of ferric chloride was added to an alcoholic solution an intense red colour was produced. This was obviously due to the existence of a second chemical entity to some extent in crude karanjin. The occurrence of this compound in pongamia seed oil and cake was investigated by means of the strong ferric chloride colour. Samples of oil and cake were extracted with alcohol and the alcoholic extracts tested with ferric chloride. Oil obtained by expression or by solvent extraction, fresh as well as old, gave positive tests. The seed cake left after pressing gave positive reaction, but not the one obtained by solvent extraction. The capacity to give the colour test is therefore closely associated with the presence of the oil, whose complete removal is the cause of the negative test with solvent-extracted cake.

The chemical compound responsible for the above bright colour reactions has now been isolated in a crystalline condition and is named "pongamol" indicating its origin and phenolic nature. It crystallises from alcohol in the form of big rhombic prisms and melts at 128–29°. It contains no nitrogen, sulphur and halogen and has the formula $C_{18}H_{14}O_4$. It possesses a methoxyl group, produces a red anthocyanin by reduction with magnesium and hydrochloric acid, gives a derivative with *p*-nitrobenzoyl chloride and yields benzoic acid on oxidation or hydrolytic fission. It therefore seems to belong to the important naturally occurring group of hydroxyflavones.

Details regarding the preparation, properties and constitution of pongamol will soon be published.

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¹ Subba Rao, Veerabhadra Rao and Seshadri, *Proc. Ind. Acad. Sci.*, 1939, 10A, 65.

A New Disease of Wheat in India

ON March 7th, 1939, the author visited the Botanical Sub-station of the *Imperial Agricultural Research Institute* at Pusa. It was found that several varieties of wheat were suffering from foot-rot, the symptoms being suggestive of *Fusarium*. One variety, Pusa 12, had different symptoms. The plants were bleached and prematurely ripened and the ears contained only shrivelled grains. The sub-coronal internodes were found to be shiny black, and the roots were black and rotten. The symptoms were suggestive of "take-all".

Isolations were made from these plants a month later. Ten pieces of diseased tissue yielded in all seven cultures of *Fusarium* and one culture which in its mycelial characters resembled *Ophiobolus graminis* Sacc. It had the two kinds of hyphæ typical of the fungus:

the fine hyaline septate hyphæ and the composite strands consisting of groups of thick "Macrohyphæ" dark in colour and strongly septate. The culture has so far produced no perithecia and no spores of any kind.

Owing to the hot weather prevalent at the time it was not convenient to make a test of the pathogenicity of the fungus.

In October 1939 twelve 100 c.c. Erlenmeyer flasks, each containing 45 grammes of soil, 5 grammes of maize-meal and 15 c.c. of water were sterilized and inoculated with the fungus. The contents of each flask were used on December 19th to infest sterilized soil in a six-inch flower pot. In each flower pot twenty-five seeds of Pusa 12 wheat were sown. On January 6th, 1940, the inoculated plants showed signs of withering and pallor of the youngest leaves and two days later they were turning distinctly yellow. The plants were much smaller than the control series in which sterilized maize-meal-soil mixture without the fungus had been added.

On removing the infected seedlings from the soil it was found that the bases of the stems were flecked with black and in severe cases were entirely of a black colour and shiny in appearance. The roots were rotten and black in colour, and carried on their surfaces the macro-hyphæ typical of *Ophiobolus graminis* (see photo-micrograph).



Macrohyphæ on the root of an inoculated wheat seedling. ($\times 123.75$)

Whether or not the fungus is *Ophiobolus graminis* Sacc. can only be determined if perithecia are produced. It is certainly, however, a disease hitherto unrecorded in India.

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A Note on the Development of the Embryo-sac in *Vogelia indica* (Lamk.)

THE embryology of the Plumbaginaceæ has attracted considerable interest in recent years. Dahlgren¹ published a monograph on the Primulaceæ and Plumbaginaceæ, describing some striking peculiarities in the embryo-sac of *Plumbagella* and other genera of the Plumbaginaceæ. Haupt² gave a different account of the development of the embryo-sac in *Plumbago capensis* which was later confirmed by Dahlgren³ himself. More recently Fagerlind⁴ and Boyes⁵ have re-investigated *Plumbagella* and in this also the development has been found to be very different from that reported by Dahlgren.

The present work on *Vogelia indica* was started in 1936 at the suggestion of Dr. P. Maheshwari. The plant grows on low-lying rocky hills at Ajmer and Mt. Abu, in Rajputana. The flowers appear in the winter season. The material was fixed in formalin-acetic-alcohol and Nawaschin's fluid and cut at 7-10 microns.

The pistil is closely surrounded by the flattened bases of the staminal filaments and contains a single ovule. When ripe, a long feathery style surmounts the small ovary.

The hypodermal archesporial cell in the nucellus divides into the primary parietal cell and megaspore-mother cell (Fig. 1). By further divisions of the former, two or three layers of wall are formed (Fig. 2). No tetrad of megaspores is produced and the mother cell grows directly into the embryo-sac. The single nucleus divides into two, nuclei and small vacuoles begin to appear even at this stage (Fig. 3). The next division gives rise to four megaspore nuclei which are placed cross-wise as shown in