FLOWERING BEHAVIOUR AND ANTHESIS OF CURCUMA LONGA L.

The spike exercised from the leaf-sheath consists of numerous bracts of which the lower one or two and a few at the top are barren. Floral bracts are green while those at the top are white or, rarely, purple. The main axis of the inflorescence is never terminated by a flower but continues to grow up to a length of 6 inches and give off bracts in acropetal succession. Each bract in its axil bears generally more than two flowers which come out in succession. Each flower is enclosed by a hyaline bract. Calyx is short, tubular and toothed (2–3-lobed). Corolla tube is narrow below and broad above. Petals 3 in number, gamopetalous, free at the top, aestivation is imbricate, the median petal is broad and hooded. Lateral staminodes are petaloid. The broad labellum is deep yellow in colour. The two sterile stamens attached at the base of the pistil are very reduced structures. The two-lobed fertile anther with two long spurs is attached to the petaloid filament in between the two lateral staminodes. Stigma capitate, slightly two-lobed, transversely oblong stigmatic surface. Style passing through the two lobes of fertile anther comes above such that the stigma remains just above the anther lobes and on the dorsal side of the spurs. Ovary globose, hairy at the top, trilocular with many ovules in each locule.

Opening of flowers takes place in the morning between 6 and 8 a.m. at a temperature of about 24°C, during which period the humidity of the atmosphere remains above 70% in the locality.

Dehiscence of anthers takes place just at the time of flower opening and pollination is observed to be brought about by insects.

The structure and position of the spurs of the fertile anther are such that it favours cross-pollination by insects. As the insect enters the flower, it pushes the spurs inside so that the dehisced anther touches and dusts the back of the insect after which the stigma comes in contact with the posterior part of the back of the insect. While the insect comes out, the stigma first detaches from the body of the insect, then from the anther lobes. Hence there is no possibility of self-pollination.

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January 12, 1960.

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VARIETAL REACTION OF JOWAR TO GRAIN SMUT IN UTTRAPRADESH

Jowar (Sorghum vulgare L.) is an important millet crop in Uttar Pradesh and every year there is a loss in grain yield of about 2–5% due to grain smut caused by Sphacelotheca sorghi (Link) Clinton. Occasionally a few fields show up to 65% grain smut infection. Thus with an average loss of even 2%, nearly 12,139 tons of grain is lost annually due to grain smut.

Work on the successful control of grain smut by fungicidal seed treatment has been reported from several States in India and abroad but it will be still desirable to obtain varieties resistant to grain smut. The work of testing varieties of jowar against grain smut with a view to evolve resistant varieties has been in progress in Uttar Pradesh for a long time.

Mehta et al. reported the results of testing 27 promising varieties or cultures of jowar against grain smut for the period 1950–1952. This work was continued for a further period of 5 years (1953–1957) with 29 more varieties and cultures of jowar. All varieties were selected in Uttar Pradesh except E.C. 1603 and Milo 4 which belong to the United States of America. The technique of inoculating the seed before sowing and counting the healthy and smutted heads from plants raised from such seed was the same as reported earlier by Mehta et al. As a result of repeated tests for resist-
ance to grain smut, the jowar varieties and cultures are grouped as follows:—

Resistant (Below 1% infection)—53/1, 4101, 31 B.

Moderately resistant (Below 5% infection).—53/2, 4404 A, 4403 B, 30 D, T 3 (4403), Milo 4.

Moderately susceptible (Below 10% infection).—48/2, 50/1, 4102, E.C. 1603, 5 T 10 E.K.

Susceptible (Below 15% infection).—48/11, 52/7, 4108, 4106 A, 8 B, 8 B 11, 9 E.K.

Very susceptible (Above 15% infection).—51/4, 4105, 4109, 4106 B, 48/1 B, 30 C, T 18.

It is evident from the results that three cultures, viz., 53/1, 4101 and 31 B proved to be highly resistant and six other cultures are moderately resistant. These cultures are not agronomically superior to the prevalent varieties but some of them are now being used by the Economic Botanist as resistant parents in a hybridization programme for combining desirable grain and yield characters with resistance to grain smut.

Thanks are due to the Economic Botanist (Oilseeds, Millets and Pulses) to Government, Uttar Pradesh, Kanpur, for the supply of jowar varieties and cultures.

Laboratory of the
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RESISTANCE OF GRAM VARIETIES TO FUSARIUM WILT IN UTTAR PRADESH, 1949-1958

GRAM (Cicer arietinum L.) is an important crop of Uttar Pradesh. Wilt of gram, caused by Fusarium orthoceras var. ciceri Appel and Woollen, is responsible for about 10% loss to the crop every year.

Since Fusarium wilt of gram is a soil-borne disease, the most satisfactory control is the use of resistant varieties. Ninety-five varieties, obtained from the Economic Botanist (Oilseeds) to Government, Uttar Pradesh, Kanpur, were tested during the period 1949-58 in a wilt sick plot which was regularly fed with large quantities of chopped straw and stubbles of completely wilted gram plants collected from different localities of the State. Before sowing the seed, the debris inoculum was spread uniformly in the wilt sick plot. This inoculum was also added to the furrows at the time of sowing. Each variety was sown in two rows of 18" long and replicated four times. When germination was complete, the total number of plants was counted and subsequently wilting plants of each variety were uprooted at regular intervals and counted. Samples of such wilted plants were also examined in the laboratory and isolations of fungi made from them in order to confirm the causative organism.

A summary of results is given below:—

Resistant (Wilted plants up to 10%)—4338-15 (106) (except during 1954-57 when the range of affected plants was 21-3-34-7%), 4317 (100), 4317-28 (93), 4318-12 (88), 4313-2, 93 and 4409-9 (101).

Moderately susceptible (Wilted plants up to 20%).—4326-8 (345) and 4320-26.

Susceptible (Wilted plants up to 50%).—4324-2, 91, 95, 98, 102, 118, 257-1, D-51, 44-4, 4, 64, 98, 190, D-69, D-59, D-66, 32-1, 32-2, 491-16, 730-2, 666, 605-15, 394/2, 678, 497-1, 742-1 and 728-8.


Most susceptible (Wilted plants up to 100%) T. 251 (Tl), Bandha, 257-8, 252-197, 45, 76; 78, 84, 94, 109, 125, 167, 176, 195, 197, 211, 305, 322, D-306, D-67, 256-8, 252-93; 44-12, 256-34, 20, 24, 41, 49, 252; 253; 257, 44-9, 44-13, 256-18, 44-10, 44-7, 492-1, T 87, and 177-11.

Laboratory of the
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* Figures within small brackets indicate the final strain numbers of hybrids and varieties assigned by the Economic Botanist (Oilseeds, Millets and Pulses) to Government, Uttar Pradesh, Kanpur.

EMBRYOLOGY OF STAPHYLEACEAE

The family Staphyleaceae since the publication of Schnarf's work has not received the attention of embryologists. The present paper deals with the embryology of Turpinia nepalensis Wall.

The anther structure shows an epidermis and three wall layers (Fig. 1). The innermost layer functions as the tapetum which is of the secretory type, contrary to the earlier reports. The tapetal cells become 2-nucleate by the time