

YET MORE PARENTS FOR SUGARCANE BREEDING

It is now known that the genus *Saccharum* (Sugarcane) hybridises with other species and genera—some of them like *Narenga narenga*, *Sorghum durra* Stapf. and *Bambusa arundinacea* being taxonomically far removed from *Saccharum*. Cytological studies of such hybrids have revealed that on the mother or the *Saccharum* side the functioning gametes may be (1) reduced, (2) non-reduced or (3) both.¹ In cases where the non-reduced gametes function, the hybrids are fertile and in case of reduced gametes, the hybrids are often sterile, at least on the pollen side.

A cross between *Saccharum officinarum* (Vellai) and *Narenga narenga* was effected in the very early years of the Station, but no economic types resulted therefrom and as their flowers proved infertile, it was not possible to further hybridise them for economic results. Cytological studies of the hybrids showed that the divisions were irregular and that reduced gametes had functioned on the mother side. A cross between *Saccharum officinarum* (Vellai) ♀ and *Saccharum spontaneum* ♂ on the other hand yielded fertile hybrids and the gametes on the mother side were found to be non-reduced.

In the year 1941 a cross was effected between the hybrids (*Vellai* × *Narenga narenga*) ♀ and (*Vellai* × *Saccharum spontaneum*) ♂ and the resultant population of 32 plants included one which was pollen fertile. The parent *Narenga narenga* which could not previously be introduced into the line of parents for cane-breeding would thus appear to have now been brought into it by this roundabout hybridisation and useful developments are expected.

By a parallel process yet another parent, *Sclerostachya*, would also appear to have become available as parent in the future breeding work at Coimbatore. Satisfactory habit and marked tillering capacity are two of the useful

characters in the two new parents thus sought to be introduced into sugarcane breeding.

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March 26, 1942.

¹ Bremer, G., *Genetica*, 1923, 5, 97, 273.

Janaki Ammal, E. K., *Jour. of Genetics*, 1941, 41, 217.

Singh, T. S. N., *Ind. Jour. Agri. Sci.*, 1934, 6, 1050.

TWO NEW REPORTS OF FUNGI ON *SACCHARUM OFFICINARUM* & *S. ARUNDINACEUM*

Schizophyllum commune Fries is a common saprophyte and it has been reported in India on the bark of dead trees from various localities (Butler and Bisby¹ and Mundkur.²). It has not been reported on the stalks of sugarcane though Butler³ reported it as a doubtful parasite on cane when he recovered the fungus from five out of one hundred and sixty-one undergerminated setts in one of his experiments at Dehra Dun. Vincens⁴ reported that the fungus was a weak parasite on sugarcane in Indo-China and that it was developing parasitic tendencies on various trees, e.g., orange, mulberry, etc.

The characteristic fructifications of the fungus were found in November 1941 on a few dead cane stalks of Co. 331 which had been killed by 'red rot'. The excentrically borne pilei were downwardly directed, being sessile or with short stalks each individual stripis being rarely more than 0.6" in length. The fructifications were borne in longitudinal rows over the internal lengths of the cane.

Similar fructifications of the fungus were observed a week later in Pusa on Co. 331 canes which were artificially infected with red rot through the inoculation of the mother setts and on red rotted Co. 331 canes brought from Motipur.

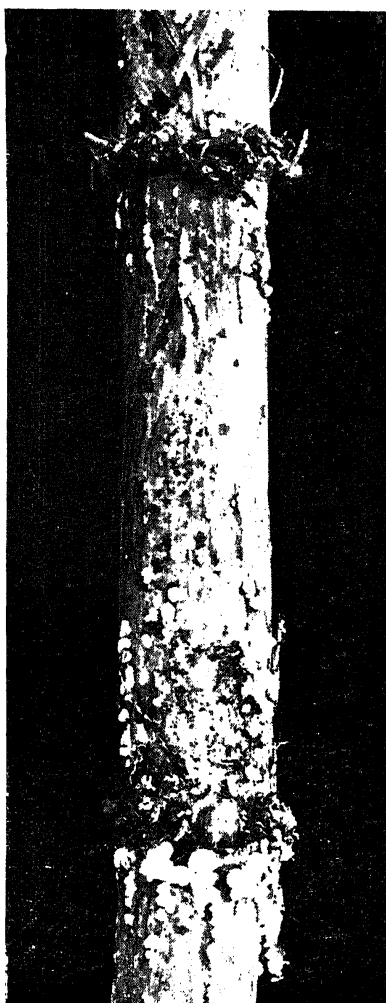


FIG. 1

Co. 331 with fructification of *Schizophyllum commune*

The three occurrences of *Schizophyllum commune* on Co. 331 suggested the possibility of weak parasitism on that variety and so inoculation tests were conducted by infecting growing stalks of Co. 331 with bits of the ripe fructifications and spore suspensions of the fungus. Five canes were bored at the bottom by means of a cork borer and the bits of fructifications introduced into the canes; into five more canes similarly bored spore suspension was introduced. After three weeks the canes were split open and the extent of infection noted on the basis of the length and width of infection and the number of internodes infected. The data averaged for each treatment are presented in Table I. *Schizophyllum commune* was recovered by culture from one of the canes in each treatment together with *Fusarium moniliforme* Sheld.

TABLE I

	Suspension	Bits of fructification
Average length of infection	6.2"	3.8"
Average number of infected internodes ..	2.2	1
Average width of infection ..	0.42"	0.44"
Average volume of infection	1.2 C. in.	0.63 C. in.

From the data *Schizophyllum commune* appears to have only very weak parasitic tendencies on sugarcane. It probably invades cane tissues after their protoplasmic resistance is completely overpowered by a parasite. The observed occurrence of the fungus on Co. 331 alone, however, suggests a selectivity on the part of the fungus, the nature of which it may be possible to explain after some more studies on its physiology are carried out.

Darlucal filum (Biv.) Cast. is a well-known parasite of the rusts and it has been reported in India on uredinea of *Puccinia polygonia amphibii* Butl. on *Polygonum* sp. from Mussoorie (Butler⁵) and on the cereal rusts *Puccinia purpurea* Cke., *P. penneseti* Zimmerm. and *P. setariae italicae* (Diet) Yoshino from South India (Ramakrishnan and Narasimhalu⁶).

During August 1940 rust caused by *Puccinia kuehnii* (Krueg.) Butl. was seen to develop abundantly on hitherto rust-free clumps of *Saccharum arundinaceum*. When sections of the rusted specimens were made, the uredosori of the fungus were found to be parasitised by *Darlucal filum* (Fig. 2). Dark globular to ovoid

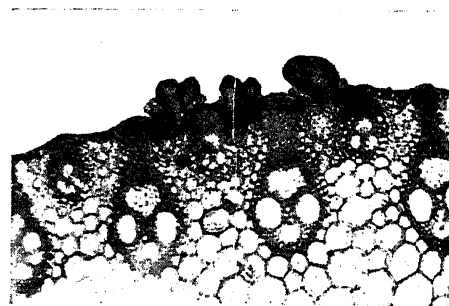


FIG. 2

Section of leaf of *Saccharum arundinaceum* with *D. filum* on *Puccinia kuehnii*

pycnidia were seen to arise, singly or in pairs from a majority of the uredosori. In the regions of the leaf where the parasite was absent, the uredosori were in dull orange coloured streaks along the length of the leaf but in the parasitised regions the sori were of a brown colour.

The pycnidia were dark in colour, ostiolate, and globular to ovoid in shape. In size they measured on an average $93.5 \mu \times 70.5 \mu$. The spores were hyaline, one septate and with a slight constriction in the region of the septum. The spores measured $15.5 \mu \times 5.1 \mu$ the range being $11.3 \mu - 18.8 \mu \times 3.8 \mu - 6.3 \mu$.

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March 16, 1942.

¹ Butler, E. J., and Bisby, G. R., *Imp. Council Agr. Res., Sci. Monogr.*, No. 1, 1931, 128.

² Mundkur, B. B., *Ibid.*, No. 12, 1938, 28.

³ Butler, E. J., *Mem. Dept. Agric., India, Bot. Series 1*, 1906, 39.

⁴ Vincens, F., *Rev. App. M₃c.*, 1921, 1, 41.

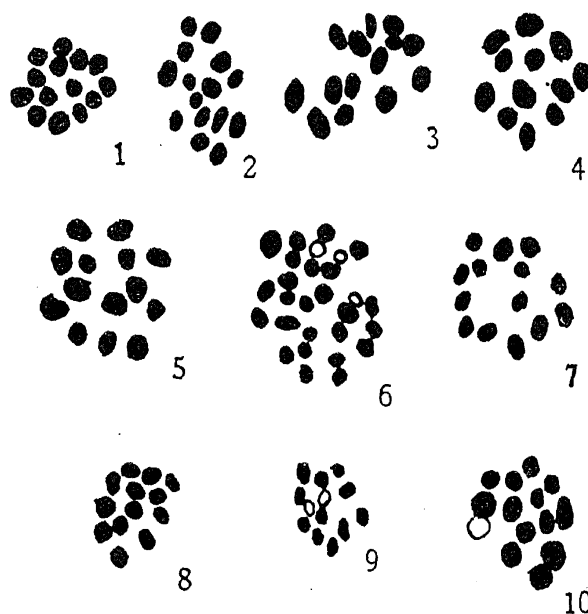
⁵ Butler, E. J., *Mem. Dept. Agric., India, Bot. Series 1*, 1906, 154.

⁶ Ramkrishnan, T. S., and Narasimhalu, I. L., "The Occurrence of *Darluca filum* (Biv.) Cast. on Cereal Rusts in South India," *Curr. Sci.*, 1941, 10, 290.

CHROMOSOME NUMBERS OF SOME CÆSALPINIACEÆ

THIS note places on record the chromosome numbers of eight species belonging to four genera of the Cæsalpiniaceæ. These are *Bauhinia acuminata* Linn., *B. purpurea* Linn., *Parkinsonia aculeata* Linn., *Cæsalpinia bonducella* Flem., *Cassia glauca* Lamk., *C. glauca* Lamk. var. *suffruticosa* Koenig., *C. marginata* Roxb., *C. obtusifolia* Linn. and *C. siamea* Lamk. The work is of interest as chromosome numbers are known only for a very small number of plants belonging to this family. The chromosome numbers for all the species reported in the present note, except the last, have been determined for the first time. They have been

determined in every case from meiotic divisions in the pollen-mother cells. The material for the investigation was collected from plants found wild or planted in various gardens at Benares. Nawaschin's fluid was used as the fixative and the sections were stained with Newton's Iodine Gentian Violet.



1. *Bauhinia acuminata*, I metaphase. 2. *B. acuminata*, II metaphase. 3. *Parkinsonia aculeata*, I metaphase. 4. *Cæsalpinia bonducella*, I metaphase. 5. *Cassia glauca*, I metaphase. 6. *C. glauca* var. *suffruticosa*, I metaphase. 7. *C. marginata*, II metaphase. 8. *C. obtusifolia*, I metaphase. 9. *C. obtusifolia*, II metaphase. 10. *C. siamea*, I metaphase.

All figures are camera lucida drawings and have been reproduced at a magnification of 1600.

The haploid chromosome numbers for the various species investigated by the author are tabulated below:

Name of the species	Haploid chromosome number
<i>Bauhinia acuminata</i> Linn.	14
<i>B. purpurea</i> Linn.	14
<i>Parkinsonia aculeata</i> Linn.	14
<i>Cæsalpinia bonducella</i> Flem.	12
<i>Cassia glauca</i> Lamk.	14
<i>C. glauca</i> Lamk. var. <i>suffruticosa</i> Koenig.	28
<i>C. marginata</i> Roxb.	14
<i>C. siamea</i> Lamk.	14
<i>C. obtusifolia</i> Linn.	13