Chromosome Numbers in Sugarcane × Bamboo Hybrids

THE sugarcane × bamboo hybrids recently produced at this station (Venkatraman, 1937), provide material for the study of the phylogenetic relationship of the genus *Saccharum* with other grasses. The gap covered by this cross is considerably wider than in the case of the *Saccharum* × *Sorghum* hybrids[1,2], or the *Saccharum* × *Erianthus* hybrids effected in Java[3].

The female parents employed were the two Java canes: *P.O.J.* 213—an interspecific hybrid between *S. officinarum* (Black Cheribon, $2n = 80$) and *S. barberi* (Chunnee, $2n = 82$); and *P.O.J.* 2725—a rather complicated hybrid cane between a number of 'noble' types and the *S. spontaneum* (*Glagah*) of Java. The male parent was *Bambusa arundinacea* Willd., a species which is common in South India.

Root tips of *P.O.J.* 213 showed 124 chromosomes at metaphase, somatic pairing of homologous chromosomes being very apparent. Bremer has reported 62 bivalents at the reduction division of pollen mother cell of this plant. He gives $2n = 106–107$ as the chromosome number of *P.O.J.* 2725[4]. Reduction division is somewhat irregular in this cane, and like a number of other hybrid sugarcanes, it has been known to produce both diploid and haploid gametes. Pollen sterility is very high in both the canes. As the ovules, however, are fertile, these canes have been used a great deal as female parents in the breeding programme at Coimbatore. 72 chromosomes were counted in the root tips of *Bambusa arundinacea*. Root tips of five of the hybrids between *P.O.J.* 213 and *Bambusa arundinacea* showed 96–100 chromosomes and one plant of the cross *P.O.J* 2725 × *Bambusa arundinacea* examined had 90 chromosome. These numbers represent approximately the sum of the haploid numbers of the two parents.

All the *Saccharum* × bamboo hybrids so far examined differ from the *Saccharum* × *Sorghum* hybrids in the fact that whereas the chromosome numbers of the latter indicate that viable embryos are formed from fertilization of both haploid and diploid gamates[5], in the former only those derived from fertilization of haploid gametes were found to be viable. They also differ from the *Saccharum* × *Imperata* hybrids (Janaki Ammal, unpublished), where viability is limited to such embryos as are derived from the fertilization of diploid gametes only.

E. K. JANAKI AMMAL.
Imperial Sugarcane Breeding Station,
Coimbatore.

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2 Janaki Ammal, E. K., and Singh, T. S. N., "A Preliminary Note on a New Saccharum × Sorghum Hybrid", *Ind. J. Agric. Sci.*, **6**, 1105–1106 (1936).

3 Rumke, jun., C. L., "Saccharum-Erianthus Bastaarden", *Archief voor de Suikerindustrie in Nederlandsche-Indie*, Deel II (1934). Mededeelingen van het Proefstation voor de Java suikerindustrie, Jaargang 1934, No. 7.

4 Bremer, "Remarks on the Cytology of Saccharum", *Facts about Sugar*, **24**, 926–7 (1929).

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Pedocalic Tendencies in Soils of Southern England

THE late Dr. C. F. Marbut proposed the division of the soils of the world into two primary groups, namely, pedocals and pedalfers. Pedocals are soils developed under climates which are too dry to maintain a continuous downward movement of water to the water table. They therefore contain a horizon of accumulation of calcium carbonate (and sometimes other salts also) in the soil profile, usually in the *B* horizon. Pedalfers are soils developed under more humid climates. They are completely leached and contain no horizon of calcium carbonate accumulation. Thus the steppe and desert soils of the semi-arid and arid regions are distinguished from the podsolic and lateritic soils of the humid temperate and humid tropical climates. It has been generally accepted that the climate of Great Britain is too wet for pedocals to develop. Under free drainage conditions, therefore, horizons of secondary calcium carbonate accumulation should not occur.

Observations on the brown forest soils of Rumania, developed from calcareous lœss, were made by me, through the courtesy of Dr. Cernescu of Bucharest, in the spring of 1937. These showed calcium carbonate concretions at the base of the *B* horizon, although brown forest soils should belong to the pedalfer group. This anomalous position led me to make detailed observations of the soils in Berkshire developed from porous calcareous parent materials, since it was thought that the deposition of secondary calcium carbonate might be a function of the calcareous nature of the parent material.

Consequently, pits were dug on the Malmstone (Upper Greensand) and Calcareous Grit formations. The Malmstone soil, developed under mixed broad-leafed woodland and free drainage conditions, revealed small soft calcium carbonate concretions at a depth of 3 ft. 9 in. at the base of the *B* horizon and in the top of the *C* horizon. The soil on the Calcareous Grit, developed under very free drainage conditions, under a stand of Scots pine at least a hundred years old, revealed secondary deposition of calcium carbonate on the upper surface and in the cracks of bands of shattered rock. These occurred at a depth of 15 in. and again at 37 in.

Analytical data showed that the Malmstone profile was weakly podsolized, since some alumina had been lost from the surface horizons. Iron oxide was apparently stable, although exceptionally low in amount. The Calcareous Grit profile showed lateritic tendencies, since there was considerable loss of silica from the soil horizons. The silica-sesquioxide ratio is about 2·0 in the soil horizons and about 3·0 in the parent material. It is suggested in this connexion that all red-brown soils developed from calcareous parent material may show loss of silica from the soil horizons.

Observations on shallow downland soils near Wantage, developed from Upper Chalk, revealed secondary deposition of calcium carbonate at a depth of 6–8 in., the horizon being about 3 in. deep. The profile was calcareous to the surface, high in organic matter, with a good crumb structure, and showing the typical profile of an English rendzina. Chalk rock fragments occurred throughout the profile, but whereas these are normally humus-stained and therefore dark brown in colour in the soil, the secondary calcium carbonate, which was structureless, showed up as a white layer. This layer was very intermittent, frequently entirely absent, and in places only represented by isolated spots. I consider, however, that this profile strongly resembles the Continental *tshernosem* (steppe soil). Its shallowness is, of course, the result of erosion. In some localities the surface horizon may be completely leached of calcium carbonate and may be slightly acid in reaction, but it does not lose its steppe-like character.

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