Tetraploid Varieties of *Sorghum vulgare*

PLANT breeders producing new sorghum varieties for use by peasants in relatively under-developed areas are faced with the problem that such varieties may quickly disappear, through crossing with the local unimproved types.

All the grain sorghums are diploid ($2n = 20$) and an obvious way to avoid contamination would be to develop tetraploid strains. Such strains might well possess other advantages, such as increased grain-size, and greater vigour of the plant as a whole. So far as I am aware, no attempt has been made to develop tetraploid sorghum varieties for general cultivation. Chin¹ reported that the relative sterility of polyploid sorghums made them of doubtful economic value: he also found that the autotetraploid strains flowered twenty days later than the corresponding diploids.

Very many varieties of *Sorghum vulgare* exist in Africa and Asia; crosses between such varieties are fertile and exhibit varying degrees of hybrid vigour. Geographical isolation has probably led to the development of local races of cultivated sorghums². It is possible that sufficient differentiation of the genomes may have taken place for preferential association to occur when more than two genomes are present, so that a degree of allopolyploidy could be obtained. Figures are not yet available for material of very different origins, but results from fairly closely related strains suggest that there are good prospects of obtaining sufficiently fertile tetraploid sorghums to be of practical value.

Autotetraploids were made from two strains, A and B, by doubling with colchicine. Both strains are derivatives of first backcrosses, selected for the earliness and plant type of the recurring parent, combined with the grain types of the non-recurring parents. 27 UT from the Belgian Congo was the recurring parent in both cases: the non-recurring parent of A was Wiru from the Lake Victoria area of Tanganyika; and that of B was Msumbiji from the southern coastal belt of Tanganyika.

The general vigour of the autotetraploids is good: the straw is shorter and stouter than that of the corresponding diploids, but the length of maturity is similar.

The F_1 and F_2 generations from the cross (autotetraploid A $\times$ autotetraploid B) gave a decidedly better seed-set than that of the parents (see Table 1).

These are preliminary figures, from plants grown late in the season (columns 2, 3 and 5) and in the greenhouse (columns 1 and 4), but the general com-

parisons should be valid. The diploid in column 5 is not the identical cross, but all the sorghum diploids here are fully fertile.

The distributions and amounts of seed set in the F_1 and F_2 generations from the tetraploid cross resemble those of the diploid more closely than do those of the autotetraploid parents, which suggests a degree of allopolyploidy. If this interpretation is correct, it should be possible to work out the relationship of sorghum varieties from crosses between their tetraploids. Even if cytological studies show that some other mechanism is involved, there are still prospects that the advantages of 'hybrid sorghum' may be obtained without the complications involved in producing hybrid seed.

The work will be published elsewhere at a more advanced stage, but the potentialities of tetraploid sorghum seem sufficiently interesting to justify presenting these preliminary results. I am indebted to the Director of Agriculture, Tanganyika, for permission to publish this communication.

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¹ Chin, T. C., *Amer. J. Bot.*, **33**, 611 (1946).

² Laubscher, F. X., *Union of S.A. Sci. Bull.*, No. 242 (1945).

Relationship between some Coastal Fauna and Arthropod-borne Fevers of North Queensland

FOLLOWING on an outbreak of dengue fever in Townsville, North Queensland, in the early months of 1954, O'Connor *et al.*¹ found that the sera of some members of species of flying foxes (genus *Pteropus*) gave positive protection tests against the dengue type 1 (Hawaiian) strain. At the same time sera were collected from locally migratory birds, the black duck (*Anas superciliosa*) and grey teal (*Querquedula gibberifrons*), which mainly frequent the inland swamps, and also from wading birds (Charadriiformes) along the sea shore. These latter are found on the mudflats and sandpits, which are often in close proximity to the mangrove swamps where the flying foxes camp during daylight hours.

The birds trapped included two locally migratory in Australia, the red-capped dotterel (*Leucopoliis alexandrinus ruficapillus*) and a silver gull (*Larus novae-hollandiae*). This latter belongs to the order Lariformes and was a young bird captured on foot because it was paralysed in both legs and one wing. The others trapped migrate during the antipodean winter to sub-arctic regions in the vicinity of Siberia to breed. They belong to the Charadriiformes and consisted of red-necked stints (*Calidris ruficollis minuta*), sharp-tailed sandpipers (*C. acuminata*) and grey-tailed tattlers (*Heteroscelus brevipes*).

This work was prompted by the reports of various authors of evidence of infection in birds by some members of the arthropod-borne viruses such as Japanese B encephalitis², and Murray Valley encephalitis³, which are immunologically related to the dengue fever group.

The birds of the seashore were selected because dengue is primarily a coastal disease⁴, and also because

Table 1. SEED-SET AS A PERCENTAGE OF THE TOTAL NUMBER OF SESSILE SPIKELETS IN THE PANICLE

Column	1	2	3	4	5
Class (per cent set)	4n Parent A	4n Parent B	4n Cross A $\times$ B, F_1	4n Cross A $\times$ B, F_2	Diploid
0-9.9	4	—	—	—	—
10-19.9	3	7	—	2	—
20-29.9	3	—	—	0	—
30-39.9	6	5	1	2	—
40-49.9	1	5	0	1	—
50-59.9	2	—	5	3	—
60-69.9	2	—	13	6	—
70-79.9	—	—	18	17	1
80-89.9	—	—	—	33	10
90-99.9	—	—	—	—	9
Arithmetic mean (per cent)	31	31	68	74	88