

the lower branches accidentally or intentionally, and it is possible that this or the cumulative effect of all the adverse factors may have brought about the reversal of sex.

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NOTE ON THE AMPHIDIPOID OF THE HYBRID OF *PENNISETUM* *TYPHOIDES* STAPF. AND HUBBARD × *P. PURPUREUM* SCHUMACH.

BURTON¹ (1942) obtained the interspecific hybrids of *P. glaucum* (L) R. Br. (syn. *P. typhoides* Stapf. and Hubbard.—the pearl millet) and *P. purpureum* Schumach. the elephant grass used as the female parent. He obtained chlorophyll variations even in the F₁s, viz., green and yellowish green types. The hybrids were triploid and highly sterile. On back crossing the F₁s, to their parents (used as pollen parents) he obtained one plant out of 5,000 spikelets sown in each case.

In 1942 the senior author obtained independently, hybrids using a male-sterile pearl millet plant as the female parent. The hybrids showed chlorophyll and vigour differences similar to Burton's observations. Since then it has been found that F₁s, are easily produced whichever the stigma parent may be either the diploid or the tetraploid species. However, having the cultivated, diploid as the female parent has its advantages in that the spikelets are not shed and the hybrid plants are easily recognised.

Since obtaining the hybrid attempts were constantly made to induce doubling of the number of chromosomes in the hybrid plant. Treatments of the seeds or the seedlings with aqueous solutions of 0.4% colchicine were not successful. The retardation of growth in the roots and shoots induced by colchicine treatment caused the ultimate death of the treated material. When it was realised that the cuttings of the stems of three internodal lengths could easily be made to strike root and the hybrid thus propagated, recourse was taken to the axillary buds with colchicine. The

when planted in water produced an abundance of roots and the bud started growth. These active axillary buds were chosen for treatment. The scale leaves were removed and the growing point exposed to a safe limit by moving the young sheathing leaves around. The buds were then treated with 0.4% colchicine emulsion in lanolin for nearly a

week. Treatments with aqueous solutions were also done. The sets were then transplanted into pots and thence into the field. Other kinds of treatments like injection of the fluid into the sheath near about the growing point with a hypodermic syringe, treatment with acenaphthene all failed. Out of a dozen sets treated and transplanted one set alone showed tillers with complete fertility in the panicles. In this set out of the three buds treated only one has become affected while the other two have remained unaffected (Fig. 6).



1. *Pennisetum typhoides* diploid, × 1/20; 2. *P. purpureum*, tetraploid, × 1/40; 3. F₁, triploid, × 1/40; 4. F₂-1 hexaploid × 1/30; 5. F₂-2, × 1/30; 6. C-induced amphidiploid the right-hand clump. The left-hand clump is not affected. × 1/50 nat. sizes.

Simultaneously a large quantity of the mature spikelets from the hybrids was sown. From them three seedlings were obtained of which two survived. Seedling F₂-1 is more vigorous than the F₂-2 and has broader and longer leaves (Figs. 4 and 5). In the appearance of the vegetative parts both resemble more the pearl millet than the elephant grass. The stems are softer, not woody and the nodal adventitious roots dormant as in the pearl millet. The two plants produced panicles, thin with long bristles, fewer and more distantly arranged spikelets resembling those of the elephant grass. The flowers are protogynous. The emergence of the stamens, however, is as in the pearl millet. The pollen treated with iodine showed high fertility in contrast to the hybrid plant. The F₂-2 has very low vigour and slower growth. Consequently the examination of the root tips of this plant has been deferred till it picks up more strength,

TABLE I

Plant	Veg. characters (Perennial or not, rhizomatous or not)	Leaves coriaceous and hairy	Anther emergence	Ht. of plant in cm.	Pollen diamet-r in μ	Fertility %	Chromo- some num- bers $2n$. ($x = 7$)
<i>P. typhoides</i> ♀ parent	Annual. Non-rhizo- matous	Somewhat coria- ceous very sparsely hairy	In full flush	270	39.18	98.6	14
<i>P. purpureum</i> ♂ parent	Perennial Rhizoma- tous	Coriaceous, hairy	Slow, not in full flush	420	42.46	95.9	28
Hybrid F_1	Perennial. Non- rhizomatous	Intermediate, hairy	Slow in flush, sterile	420	34.43	1.6	21
F_2-1	Probably perennial, Non-rhizomatous? Like mother	Like mother	Full flush	283	69.01	92.8	42
F_2-2	do	Like mother. Leaves narrow	do	283	56.2	74.0	c. 35
C-induced fertile shoots	Probably perennial. Like male parent	Like F_1 , shorter and broader	Full flush	430	69.01	92.8	42

The F_2-1 has shown 42 chromosomes in the somatic cells.

The bud that showed colchicine effect has produced about ten shoots. The vigour of these shoots is slightly more than that of the shoots from the unaffected buds. The stems are thick and woody. The peculiar growth habit of the elephant grass with sugarcane-like appearance and the older stems becoming woody with adventitious roots developing from the nodes is continued in the induced shoots, while in the seedling F_2 s, this habit is absent and the stems are more tender. The leaves are somewhat shorter and broader. The panicles in appearance are like that of the elephant grass. The emergence of the anthers is in a flush as in the pearl millet and the fertile pollen is formed in plenty. The pollen mother-cells of this plant were examined cursorily in iron-acetocarmine and it was found that the chromosome number was $2n=42$, showing that doubling had taken place.

P. typhoides is diploid with 14 somatic chromosomes (Fig. 1). The Napier or the elephant grass has two types (1) with anthers emerging slow and thinly arranged spikelets (Fig. 2), and (2) with anthers emerging in a flush and closely arranged spikelets. Both have the same chromosome number, viz., $2n=28$. The first type was used as the male parent in the hybrid reported here. Thus *P. purpureum* is a tetraploid species. The hybrid is triploid with $2n=21$ (Fig. 3). The cytogenetical behaviour of the two amphidiploids and their progeny would be highly interesting since the induced one differs greatly from the one obtained from the F_2 , and the F_1 , shows pairing affinities between the *P. typhoides* and the *P. purpureum* genomes. The F_2 plants also show multivalent formations in the P. M. Cells. The behaviours of some of the prominent characters are summarised in Table I above.

The detailed cytological behaviour of these plants are being studied. Hybridizations between the $2n$ and $6n$ plants and also between the different *Pennisetum* species are being done. In the F_2-2 a rough examination of the P. M. Cs. showed multivalent formation and the exact numbers of chromosomes will be reported elsewhere after its determination, in the root tips.

It is suggested that the amphidiploid may be named as *Pennisetum purpureotyphoides*.

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ANGULAR LEAF-SPOT OF KUDZU IN MYSORE

A *Cercospora* leaf-spot disease of kudzu (*Pueraria thunbergiana* Benth.) was observed in Bangalore, South India, on some of the plants grown for experimental purposes. Kudzu is a leguminous cover crop introduced in Bangalore from imported seeds. The fungus incited severe spotting of the leaves and hastened defoliation. Young lesions were light brown and gradually widened into dark-brown angular spots. When large areas were involved, the leaves dropped off.

Similar angular spots of kudzu causing severe damage in Georgia, United States, was recently reported by Weimer and Luttrell² as due to *Mycosphaerella Pueraricola* (Yamamoto) Weimer and Luttrell. Its conidial stage *Cercospora Pueraricola* Yamamoto was first recorded in Formosa (Yamamoto³) and