TABLE I

Plant	Veg. characters (Perennial or not, rhizomatous or not)	Leaves coriaceous and hairy	Anther emergence	Ht. of plant in cm.	Pollen diameter in μ	Fertility %	Chromosome numbers $2n$. ($x = 7$)
P. typhoides ♀ parent	Annual. Non-rhizomatous	Somewhat coriaceous very sparsely hairy	In full flush	270	39·18	98·6	14
P. purpureum ♂ parent	Perennial Rhizomatous	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_2s, 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*.

Cytogenetics Laboratory, N. KRISHNASWAMY.
Agri. Res. Institute, V. S. RAMAN.
Lawley Road P.O.,
December 11, 1948.

1. Burton, G. W., *J. Hered.*, 1944, **35**, 227.

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 Luttrell[2] as due to *Mycosphaerella Pueraricola* (Yamamoto) Weimer and Luttrell. Its conidial stage *Cercospora Pueraricola* Yamamoto was first recorded in Formosa (Yamamoto[3]) and

later in China (Tai[1]). It has not so far been recorded from any other place in the Orient. *C. Puerariae* Syd. reported from the Philippines on *Pueraria Phaseoli* is a different species. Weimer and Luttrell assume that *Mycosphaerella Pueraricola* has been introduced into the United States along with kudzu seeds imported from Japan.

Microscopic studies of the diseased kudzu leaves collected in Bangalore, revealed the tufts of conidiophores arising from the pseudoparenchymatic stroma. They were amphigenous, but mostly hypophyllous, simple, olive-brown, 1-6 septate, 85-180 × 3·5-4·5 μ. Conidia were hyaline, obclavate to cylindric, filiform at the apex, up to 15-septate, 85-170 × 3 - 3·5 μ. The conidia and the conidiophores were therefore slightly larger than the measurements given by Weimer and Luttrell for *M. Pueraricola* (conidiophores 20-84 × 4-4. 5 μ, conidia 25·2-126×3-5·3 μ).

The present record of *Cercospra* on kudzu plants in Bangalore grown from imported seeds is of interest since no *Cercospora* species is known on kudzu or *Pueraria tuberosa* DC. the only indigenous species known in South India. Care should be exercised in preventing the spread of the disease if large-scale cultivation of kudzu is undetraken.

Bangalore, M. J. THIRUMALACHAR.
December 15, 1948.

1. Tai, F. L., *Bull. Chinese Bot. Soc.*, 1936, **2**, 45-66. 2. Weimer, J. L. and Luttrell, E. S., *Phytopathology*, 1948, **38**, 348-58. 3. Yamamoto, W., *Trans. Sapporo Nat. Hist. Soc.*, 1934, **13**, 139-42.

PRODUCTION OF THYMOL FROM AJOWAN SEEDS

AJOWAN oil distilled from the seeds of an umbelliferous plant, the ptychotis ajowan (*Carum Copticum*), is an important source of thymol in India.

A general survey of the oil content of the ajowan seeds gathered from the villages of Punjab is made in this laboratory. Steam distillation of the coarsely ground seeds is best for the extraction of the oil.[1] Treatment of the coarsely ground seeds with solutions of different concentrations of alkalis or salts followed by steam distillation lowers the yield of the oil.

Iklas seeds give a maximum average yield of 4·2% of oil on the weight of the seeds.

Thymol in ajowan oil is estimated by its conversion into iodo-derivative and titrating the excess of iodine.[2] The oil from the seeds of Iklas and Sabazpur contain respectively 39·3% and 36·2% thymol on the weight of the oil. Method of Dodge[3] presents difficulties due to the formation of stable emulsions.

EXTRACTION OF AJOWAN OIL

TABLE I

Method: Steam distillation. 100 gms. of coarsely ground seeds used in each distillation

Distillation	Locality of seeds	Yield of oil in gms.	Colour of the oil
1	Nagawali	2·85	Light yellow
2	,,	2·99	,,
3	Pindighels	3·63	Golden yellow
4	,,	3·53	,,
5	Domeli	3·97	Light brown
6	,,	3·83	,,
7	Sabazpur	4·18	Light yellow
8	,,	4·13	,,
9	Iklas	4·15	,,
10	,,	4·23	,,

TABLE II

Method: Steam distillation. 100 gms. of coarsely ground Iklas seeds used in each case after treatment with alkali or salt

Distillation	Treatment	Yield of oil in gms.	Colour of the oil
1	Kept 8 hrs. with 500 c.c. 5% NaOH	0·5	Light brown
2	,, ,, 1% NaOH	1·01	Brown
3	,, ,, 2N NaCl	1·53	,,
4	,, ,, 5N KNO_3	2·23	,,

According to Chopra and Mukherjee[4] the seeds from different parts of the country yielded varying proportions of oil ranging from 2·0 to 3·5%. Seeds obtained from the Kurnool-Guntakal district of Madras Presidency appeared to be the best obtainable in India. These seeds gave a high yield of oil, *i.e.*, 3·5%. The seeds obtained from Northern India yielded only 2·07% of the oil, and the percentage of thymol in most of the Indian oils is not more than 33 to 37%.[4]

This publication is delayed due to the political changes at Lahore.

Technical Chem. Laboratory,
Forman Christian College, JAMES VERGHESE.
Lahore, K. C. GULATI.
November 25, 1948. M. L. JOSHI.

1. Inuganti, Bhate and Hassan, *Industries and Commerce, Nizam Govt. Publication, Bull.* 1924, 8. 2-3. 2. *Allen's Commercial Organic Analysis*, **4**, 138. 3. Dodge, *Amer Perfumer*, 1939, **35**, 4, 39 4. Chopra and Mukherjee, *The Ind. Med. Gaz.*, 1932, **67**, 361-62.