2 Gopinath Pillai, C. S., *Proc. of the symposium on corals and coral reefs*. Mar. Biol. Assn. India, Cochin, 1972, 191.

MORPHOLOGICAL AND GROWTH CHARACTERISTICS OF WILD AND HYBRID PEANUTS (*ARACHIS* SP.) CULTURED *IN VITRO*

S. SUKUMAR and S. R. SREE RANGASAMY
School of Genetics, Tamil Nadu Agricultural University, Coimbatore 641 003, India.

GROUNDNUT, has proved to be recalcitrant for plantlet regeneration from callus. A limited ability for organ differentation in legume callus has been reported in peas[1], alfalfa[2], soybean[3] and cultivated peanut[4]. There has been no report on the culture and maintenance of calli from wild species of *Arachis* with differing levels of polyploidy, which are useful in breeding work. This report attempts to present the work in this area.

Seven wild species of *Arachis* (three diploids and four tetraploids) and two interspecific hybrids grown under field conditions at the author's laboratory formed the source for various explants. Portions of stem, petiole and pinna were excised, washed well with water, surface-sterilized with 0.1% mercuric chloride for 1 min and finally rinsed thrice with double-distilled water. Standard Murashige and Skoog's medium supplemented with casein hydrolysate (0.1% w/v), coconut water (15% v/v) and 24-D (2 mg/l) was used. Twenty replicates were inoculated for each explant (with uniform expression) in each species or hybrid and the cultures were maintained under 16 hr daily light regime (2000 lux) at 25 + 1°C.

Figure 1 shows the percentage response of vegetative explants from wild species and hybrids for callusing. In

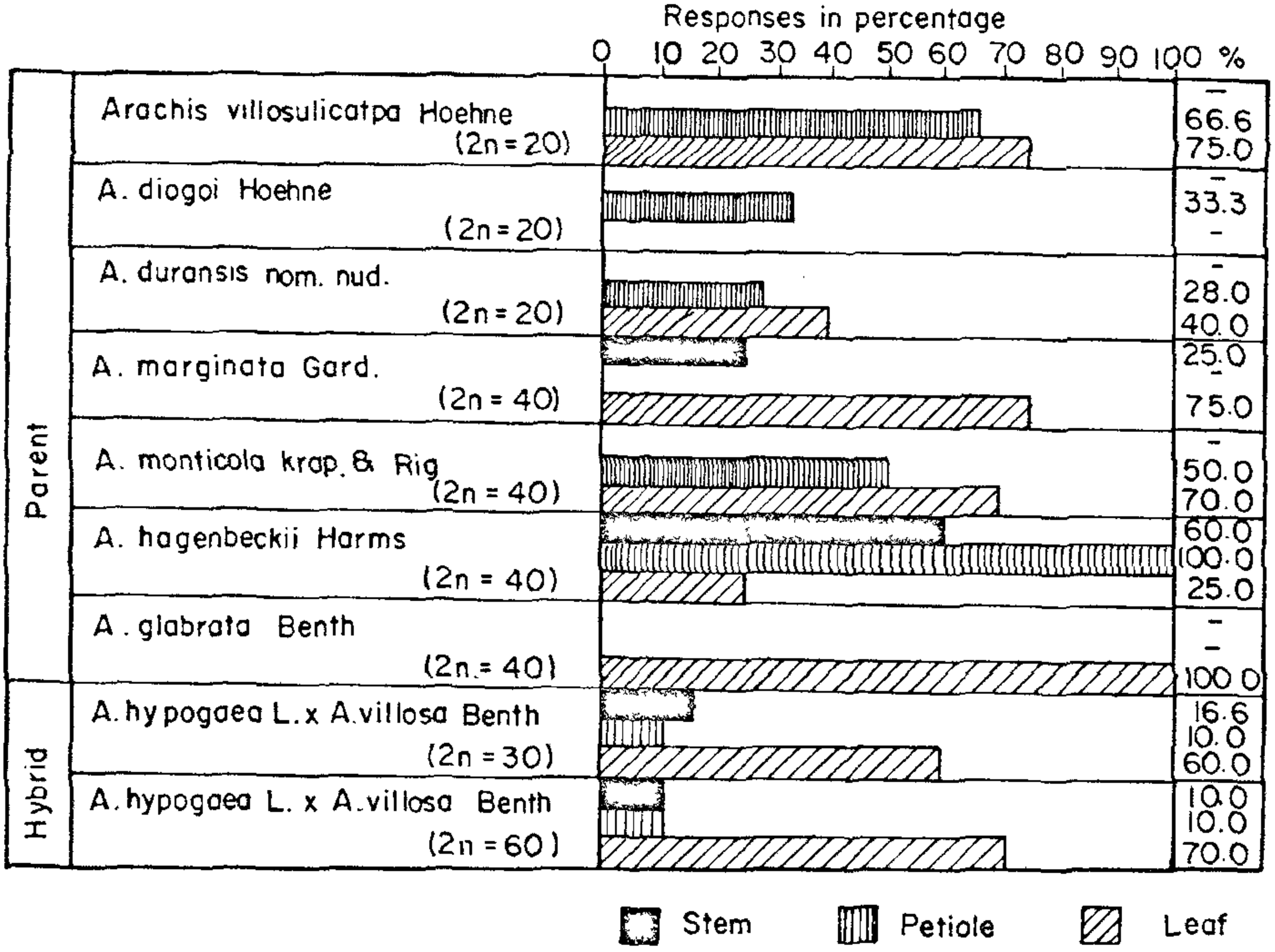
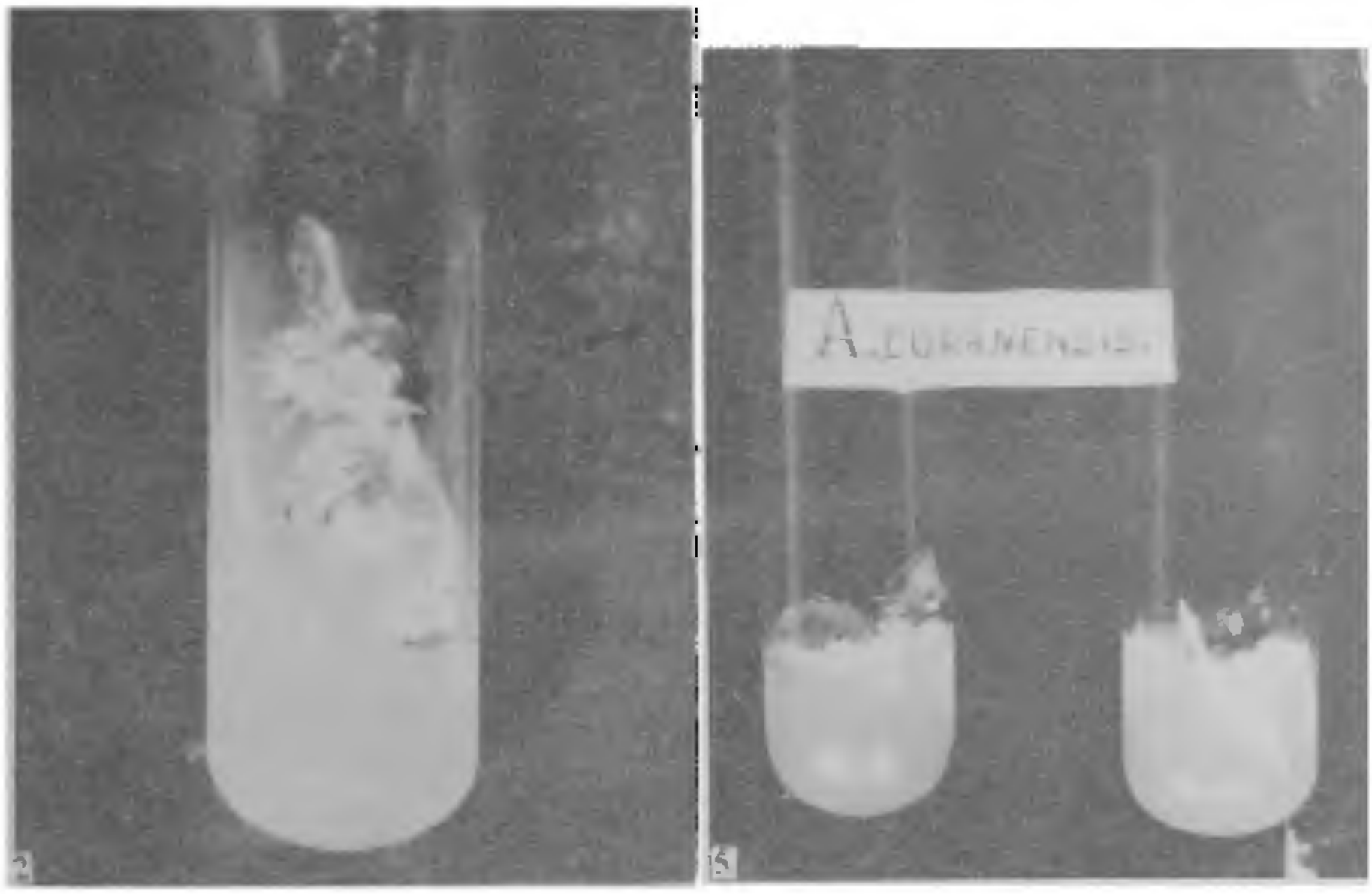
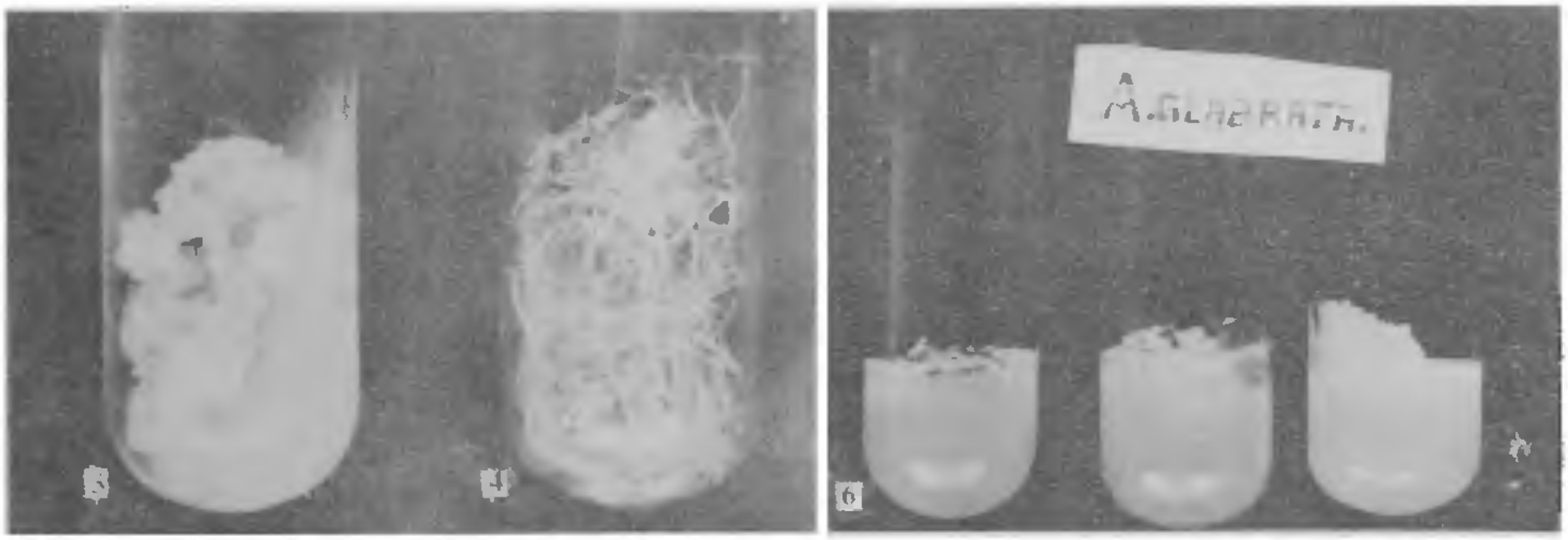


Figure 1. Explant responses of wild polyploid species and hybrids in *Arachis*.





Figures 2–6. 2. Formation of roots from leaf-derived calli of *Arachis villosulicarpa* Hoehne prior to first subculture; **3.** Profuse callusing in *A. monticola* Krap & Rig.; **4.** Profuse rooting in *A. villosulicarpa* Hoehne. Note the branched roots; **5.** Thick root formation in *A. duranensis* nom. nud. (Note the leaf segment explant); **6.** Stages in the initiation of calli in *A. glabrata* Benth.

20 days, the explants started proliferating into callus. Pinna segments proliferated more readily than stem and petiole explants. Microscopic observations showed that these calli was subepidermal. As pinna segments showed a greater response to the complex medium than petiole and stem, the study of morphogenesis was confined to the pinna-derived callus. The details of various characteristics of pinna-derived calli without cytokinins are presented in table 1. Variations were high in respect of growth rate and the degree of differentiation in explants. The calli were smooth or nodular and they were either firm or soft. The callus generally consisted largely of parenchyma cells of varying sizes with larger nuclei.

Several investigators have reported differentiation of roots from callus in a medium containing auxin and cytokinin[5]. But diploid species of *Arachis villosulicarpa* Hoehne. ($2n = 0$) and *A. duranensis* nom. nud ($2n = 20$) showed characteristic root formation without root-inducing hormones prior to first subculture. Branched rootlets were also observed in *Arachis villosulicarpa* Hoehne. ($2n = 20$). This indicates high re-

Table 1 *Morphology and rhizogenesis in leaf-derived calli from wild species and hybrids of Arachis*

Wild species	Origin of calli	Nature of calli	Rhizogenesis
Parent			
Arachis villosulicarpa Hoehne ($2n = 20$)	Laminar and midrib	White to yellow and soft	Profuse rooting with rootlets
A. diogoi Hoehne ($2n = 20$)	No callusing	—	—
A. duranensis nom. nud ($2n = 20$)	Laminar	White friable	Thick root formation with branches
A. marginata Gard ($2n = 40$)	Laminar	Dark brownish	–do–
A. monticola Krap & Rig. ($2n = 40$)	Laminar and midrib	Dark brownish	–do–
A. hagenbeckii Harms ($2n = 40$)	Midrib	White and soft	–do–
A. glabrata Benth ($2n = 40$)	Laminar and midrib	Light yellowish and soft	–do–
Hybrid			
A. hypogaea L. × *A. villosa* Benth ($2n = 30$)	Laminar	Light brownish	Thick root formation without rootlets
A. hypogaea L. × *A. villosa* Benth ($2n = 60$)	Cut ends of the lamina	White and soft	No rooting

sponse or interaction effect of genotypes of diploid cells to high concentration of casein hydrolysate and coconut water. However, polyploid species did not show rooting even after several subcultures in similar treatments; only profuse callusing was noticed. But in the case of triploid hybrid ($2n = 30$) of *A. hypogaea* × *A. villosa* Benth, short and thick root formation was noticed. Subculturing of the callus tissues in a medium without casein hydrolysate and 2,4-D stimulated faster growth of calli from the polyploid species. But none of the species of *Arachis* except *A. villosulicarpa* Hoehne exhibited differentiation of shoot buds. In *A. villosulicarpa* Hoehne, successful shoot induction was noticed even without the addition of cytokinins[6].

The authors are thankful to Prof. N. Sundaram, for providing us the materials in carrying out this work.

18 November 1983; Revised 13 February 1983

1. Torrey, J. G., *Physiologia Plant*, 1967, **20**, 265.
2. Bingham, E. T., Hurley, L. V., Kaatz, D. M. and Saunders, J. W., *Crop Sci.*, 1975, **15**, 719.
3. Beversdorf, W. D. and Bingham, E. T., *Crop Sci.*, 1977, **17**, 307.
4. Mroginski, L. A. and Fernandez, A., *Oleagineux*, 1980, **35**, 89.
5. Padmanabhan, C., Sukumar, S. and Sree Rangasamy, S. R., *Curr. Sci.*, 1981, **50**, 195.
6. Sree Rangasamy, S. R., Sukumar, S. and Padmanabhan, C., 1981, *TNAU Newslett.*, 10, 2.

INFLUENCE OF *GLOMUS FASCICULATUM* ON DAMPING-OFF OF TOMATO

S. V. HEGDE and P. V. RAI
Department of Microbiology, University of Agricultural Sciences, GKVK Campus, Bangalore 560065, India.

THE vesicular-arbuscular (VA) mycorrhizal fungi are known to interact with root infecting soil-borne plant pathogenic micro-organisms[1]. Colonization by *Fusarium oxysporum* f. sp. *lycopersici* decreased more in mycorrhizal tomato plants than in non-mycorrhizal plants[2]. The effect of VA mycorrhiza, *Glomus fasciculatum*, on damping-off of tomato (*Lycopersicon esculentum* Mill.) caused by *Pythium aphanidermatum* (Edson) Fitzp. studies reported in this paper.

The experiment was conducted in pot culture, under green house conditions. Tomato var Pusa Ruby seedlings were raised in steam-sterilized soil and 22-day old seedlings were transplanted into 20 × 18 cm size earthen pots, each containing 2 kg of red soil mixed with 1 % (w/w) compost. The plants received the following inoculation treatments: (1) uninoculated control, (2) mycorrhiza (M) only, (3) pythium (P) only, (4) both (M) and (P) at the time of transplanting, (5) M at transplanting and P two weeks after transplanting and (6) P at transplanting and M two weeks after transplanting. There were four pots under each treatment and two seedlings were planted in each pot. The mycorrhizal inoculum consisted of a mixture of root pieces and soil from a pot culture of guinea grass