Table 1. Protoplast yield (x 10^5 per g fresh mass of leaves) of *Arachis hypogaea* and *A. villosa* in different enzyme solutions, Punjab Agricultural University, Ludhiana, Punjab, India.

Enzyme solution	*A. hypogaea* Duration of treatment (h)			*A. villosa* Duration of treatment (h)		
	9	12	15	9	12	15
E1 = cell 1% + mac 0.75%	0.4	0.6	0.8	0.2	0.3	0.5
E2 = cell 1.5% + mac 1%	0.5	0.7	1.4	0.3	0.6	1.2
E3 = cell 2.5% + mac 1.5%	0.7	0.9	1.2	0.4	1.0	1.2

gram of fresh leaf mass) was obtained in E_2 enzyme solution incubated for 15 h (Table 1).

Fusions were accomplished among the mesophyll protoplasts (green) of *A. hypogaea* and the callus-derived protoplasts (colorless) of *A. vilosa* by treatment with 20-25% polyethylene glycol (PEG 6000) for 30-45 min. Treatment with 20% PEG for 45 min yielded better results (Fig. 1), and there were comparatively fewer distortions. The fusion products could be easily distinguished.

The conditions for the isolation and fusion of protoplasts have thus been optimized, and continued studies on somatic hybridization are expected to result in wider genetic variability.

Reference

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Stability of Seed Mass in Confectionery Groundnut

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Seed mass in groundnut is an important trait that often determines its end use. Small-seeded groundnuts are, in general, crushed for oil whereas the large-seeded types are preferred for making a variety of confections. About one-third of the total world groundnut output is used for confectionery requirement, with a specific preference for large seed size. Therefore, the stability of seed mass assumes significant importance in a confectionery breeding program.

Development of groundnut cultivars with large seed mass is an important breeding activity at ICRISAT Center. Promising lines, derived from crosses between the large-seeded germplasm lines and high-yielding adapted varieties, are selected on the basis of pod yield and large seed mass [>80 g (100 seeds)$^{-1}$]. After replicated evaluation at ICRISAT Center and Subcenters, selected lines are channeled to national programs, in the form of international trials, to test their adaptability and stability for pod yield and seed mass in diverse groundnut-growing environments.

The first International Confectionery Groundnut Varietal Trial (ICGVT 85) consisting of 24 test entries, together with provision for one local variety as control, was sent to 16 countries in 1985 and the data for pod yield and 100-seed mass obtained from 10 locations were analyzed, following Finlay and Wilkinson (1963). Table 1 gives the range, mean, and regression coefficient of pod yield and 100-seed mass. While most of the lines yielded over 3 t ha^{-1} over the locations, considerable variation was observed between locations. Similarly most of these lines showed a wide range of variation for 100-seed mass. While several lines showed higher seed mass than the local control variety at individual locations, only two, recorded an overall mean 100-seed mass greater than 70 g. ICGV 86573 had 100-seed mass 77 g and ICGV 86725 recorded 100-seed mass of 73 g. In Zambia, USA, and Taiwan none of the lines could produce higher 100-seed mass than the local control variety.

Significant genotype x environment interaction was observed for both pod yield and seed mass.

Regression coefficient (b) and per se performance, which determine the stability of a genotype over environments, have been plotted for seed mass (Fig. 1). Among the varieties included in the trial the cultivar, Robut 33-1 has the smallest 'b' value (0.72) and therefore appears most stable for seed mass. However, it is not suitable for confectionery use because of its lighter seed mass (51 g). A general increase in the 'b' value with the increase in seed mass indicates the sensitivity of this characteristic to environmental changes in these lines. Of the two lines, ICGV 86573 and ICGV 86725, with mean 100-seed mass greater than 70 g, ICGV 86725 was more stable compared to ICGV 86573.

Table 1. Range and overall mean for pod yield and seed mass of the 25 groundnut genotypes tested across 10 countries during 1986.

Identity	Pod yield (t ha^{-1})			100-seed mass (g)		
	Regression coefficient (b)	Mean	Range	Regression coefficient (b)	Mean	Range
ICGV 86981	0.83	3.34	1.45-4.89	1.10	62	39-93
ICGV 86982	1.04	3.36	1.09-5.61	0.75	50	34-77
ICGV 86983	0.77	3.58	1.30-5.06	0.79	59	40-80
ICGV 86984	1.01	2.90	1.15-5.78	0.88	55	32-77
ICGV 86547	1.06	3.30	1.13-5.01	1.19	64	40-95
ICGV 86723	0.77	3.06	1.45-4.68	1.10	52	31-79
ICGV 86025	1.04	3.27	1.37-5.19	0.88	54	32-77
ICGV 86986	0.80	3.21	1.32-5.25	0.78	60	39-78
ICGV 86573	1.23	3.73	1.35-7.89	1.50	77	62-110
ICGV 86727	1.25	3.75	1.28-5.89	0.99	57	35-89
ICGV 86566	1.01	3.12	1.23-5.84	1.13	67	38-95
ICGV 86988	0.94	3.24	1.52-5.47	1.24	59	36-89
ICGV 86989	0.97	3.21	0.78-5.72	0.92	53	34-87
ICGV 86724	0.79	3.37	1.45-5.22	1.03	63	41-95
ICGV 86725	1.02	3.57	1.24-6.04	1.06	73	45-93
ICGV 86996	0.87	3.33	1.45-5.15	1.01	61	37-93
ICGV 86559	0.91	3.44	1.50-5.47	1.08	64	40-91
ICGV 86726	0.91	3.36	1.32-5.18	0.77	64	41-82
ICGV 86993	0.97	3.48	1.56-5.66	0.77	60	41-78
ICGV 86730	1.03	3.35	1.44-5.59	0.81	55	33-72
ICGV 86995	1.17	3.14	1.08-6.31	0.99	59	38-81
ICGV 86574	1.26	3.29	1.02-6.97	1.23	69	44-93
ICGV 86561	1.33	3.63	1.40-9.00	1.21	65	43-89
Control						
Robut 33-1	0.83	3.29	1.54-5.19	0.72	51	31-68
Local variety[1]	1.15	3.64	1.25-7.56	1.02	67	39-117
SE	± 0.13	± 0.10	-	± 0.19	± 1.40	-
CV(%)			6-21			6-10

1. Cooperators were requested to include their best confectionery variety/line as local control in the trial.

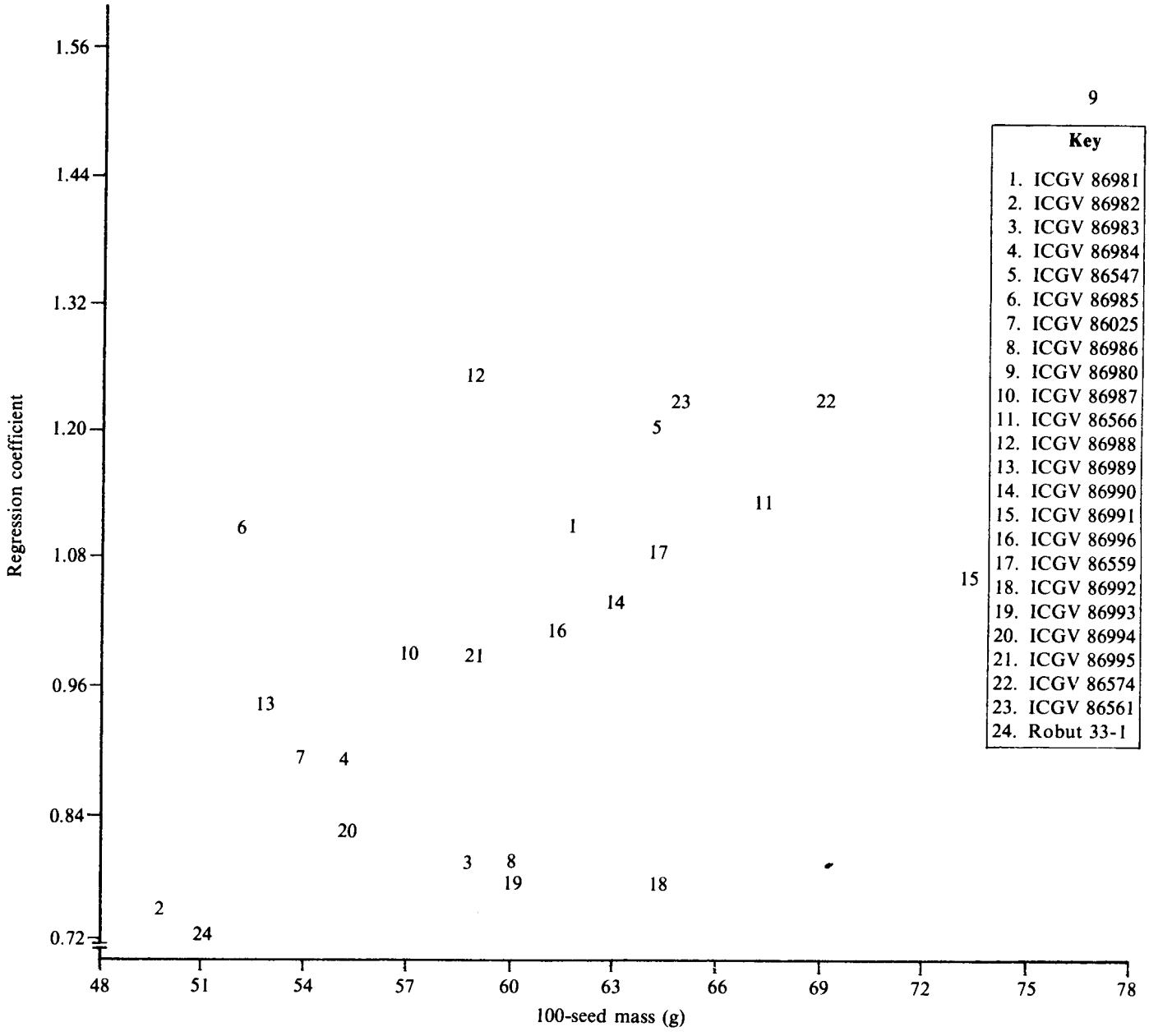

Figure 1. Regression coefficient (b) and 100-seed mass over locations for 24 confectionery groundnut lines.

Reference

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Record of *Meloidogyne javanica* on Groundnut in Gujarat, India

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The groundnut crop in Kapadvanj area of Kheda district of Gujarat state was noticed to be severely