non-significant at 8.91 degrees of freedom. Thus the results imply that even all these eight independent variables taken together would not account for any significant amount of variation in the attitude of the employees towards their organisations. The 't' test of significance indicates that regression coefficients (b- values) were non-significant for all the selected independent variables. But it was seen that the 't' value for sources of information utilized approaches the significant value at 0.05 level of probability. Therefore, in comparison to other factors, sources of information utilised might be taken into consideration as one of the most important factor to predict the attitude level of the employees towards the Non-Governmental Organisations.

For the success of the voluntary system, it is essential that the employees of the NGOs should have favourable attitude towards their organisations. As two individuals are not alike, their attitude may differ depending upon a number of factors. Therefore, the findings of the study would provide informations about factors affecting the attitude of the employees of NGOs towards their organisations. In order to keep track of the changing attitudes, periodical evaluation should be made regularly. Efforts should be made to change the unfavourable attitude into a favourable one.

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UTILISATION OF WILD RELATIVES IN CROP IMPROVEMENT OF GROUNDNUT

S.KALAIMANI, S.THANGAVELU, R.SETHUPATHI RAMALINGAM AND V.MANOHARAN
Regional Research Station
TamilNadu Agricultural University
Vridhachalam 606 001

ABSTRACT

In order to transfer the desirable features of wild *Arachis* into cultivated groundnut, autopolyploids were induced in three diploid species *viz., A.cardenasii A.stenosperma* and *A.chacoense*. The quadrivalent frequency in the autotetraploids was generally low ranging from 2.2 *(A.cardenasii)* to 4.7 per cent *(A.chacoense)*. Despite moderate pollen fertility, the plants were used seed sterile. Hybridisation of the autotetraploids with different forms of *A.hypogaea* cultivars indicated that the crossability varied not only with the autotetraploids species but also with the different forms of cultivars used. The studies have resulted in the identification of plants having rust resistance transferred from wild species.

KEY WORDS: *Arachis* wild sp. Autotetraploids, Crossability Interspecific Gene Transfer

Utilisation of wild species for breeding for pests and diseases resistance has recently gained importance. As the cultivated species have a very narrow genetic base, the related species provide a spectrum of resistant genes for the crop improvement. In groundnut, the wild species

Table 1. Chromosome association and pollen fertility in the autotetraploids

Name of autotetraploid species	Chromosome association (mean of 20 cells)				Mean Pollen fertility (%)
	I	II	III	IV	
A. cardenasii	4.4	12.3	0.76	2.18	52
A. stenosperma	3.1	10.1	1.30	3.2	41
A. chacoense	1.9	9.2	0.30	4.7	46

belongs to the section *Arachis* have a high degree of resistance to rust and ploidy differences are the major barriers for interspecific gene transfer. By cytogenetic manipulations, the level of gene transfer can be improved. This paper explains the transfer of wild genes to the cultivated species through induction of autopolyploids

MATERIALS AND METHODS

Three wild diploid species of the section *Arachis viz.*, *A.chacoense* Krap et Greg. nom. nud., *A.cardenasii* krap et Greg. non. nud., and *A.stenosperma* Krap et Greg. were chosen for the study. The seedlings of the wild species were raised in pots. The treatments with colchicine 0.4 per cent were given as per the method of Singh and Moss (1984). To ensure uniform ploidy level, only treated meristems were allowed to grow. These plants were transferred to field for studying the morphological characters and cytological behaviour. The induced polyploids were crossed with different botanical forms of *A.hypogaea* L. and the F_1s raised during *kharif* 1988 for cytological and morphological studies.

RESULTS AND DISCUSSIONS

The autopolyploids showed greater vigour, prolonged growth duration and flowering. The pattern of chromosome association indicated low frequency of quadrivalents in general ranging from 2.2 *A.cardenasii)* to 4.7 per cent *(A.chacoense)* (Table1). Such reduction in multivalents association may be attributed to preferential pairing between specific chromosomes in the case of species which are relatively heterozygous due to a low frequency of chiasma formation in raw autotetraploids and due to genetic imbalance leading to break down of multivalents association into bivalents in metaphase I (Singh, 1986).

A.cardenasii showed comparatively lesser number of quadrivalents than others. This may be attributed to that taxa which is relatively of recent origin and structurally heterozygous may not show many quadrivalents in their tetraploids (Sybenga, 1975). *A.cardenasii* may be of such species. The highest quadrivalent frequency observed in *A.chacoense* may be attributed either due to greater homozygosity and primitive nature or the more random distribution of chiasmata (Singh, 1986). The observations on pollen fertility indicated that the fertility was high in *A.cardenasii* with 52 per cent (Table 2) However, significant variation in pollen fertility was recorded within the autotetraploid of the same species which may be attributed to the disturbed genetic and physiological equilibrium in a raw autotetraploid. Despite the moderate pollen fertility the plants were seed sterile.

The results of cytological analysis in the hybrids between *A.hypogaea* and the

Table 2. Chromosome association, pollen and pod fertility and reaction to rust in the hybrids between *A.hypogaea* x autopolyploids

Cross *A.hypogaea* x autopolyploid	Chromosome association (mean of 20 cells)				Pollen fertility (%) Range	Pods formed		Reaction to rust (1-9 scale)
	I	II	III	IV		Range	Total	
A. hypogaea x *A. cardenasii*	7.5	12.1	1.7	0.8	18-23	1-4	19	2.1
A. hypogaea x *A. stenosperma*	8.7	11.2	2.3	0.5	15-29	1-3	33	2.4
A. hypogaea x *A. chacoense*	5.7	14.4	0.9	0.7	38-54	1-6	63	2.0
A. hypogaea (VRI 2)					72-93			8.0

Table 3. Details on pod set in the crosses between *A. hypogaea* and autotetraploids

A. hypogaea x autotetraploids			No. of flowers pollinated	No. of pods formed	% of pod set	% of pod set for each form of *A. hypogaea*
TMV 7	x	*A. cardenasii*	396	7	1.8	1.7
Co 2	x	*A. cardenasii*	326	5	1.5	
NCAC 17090	x	*A. cardenasii*	296	7	2.4	1.7
NCAC 17135	x	*A. cardenasii*	288	3	1.0	
TMV 10	x	*A. cardenasii*	208	11	5.3	5.2
R.33 - 1	x	*A. cardenasii*	195	10	5.1	
				Mean	2.5	
TMV 7	x	*A. stenosperma*	406	24	5.9	5.2
Co 2	x	*A. stenosperma*	365	16	4.4	
NCAC 17090	x	*A. stenosperma*	315	11	3.5	3.9
NCAC 17135	x	*A. stenosperma*	268	12	4.5	
TMV 10	x	*A. stenosperma*	252	9	3.6	3.4
R.33 - 1	x	*A. stenosperma*	216	7	3.2	
				Mean	4.3	
TMV 7	x	*A. chacoense*	502	28	5.6	4.3
Co 2	x	*A. chacoense*	468	14	2.9	
NCAC 17090	x	*A. chacoense*	336	11	3.2	3.2
NCAC 17135	x	*A. chacoense*	303	9	2.9	
TMV 10	x	*A. chacoense*	386	12	3.1	3.0
R.33 - 1	x	*A. chacoense*	205	6	2.9	
				Mean	2.5	

autopolyploids are presented in Table 2. Formation of mostly bivalents apart from univalents and multivalents is attributed to intergenomic homologous pairing between the chromosomes of these wild species and *A.hypogaea*. Hybridisation between the different forms of *A.hypogaea* cultivars and the induced polyploids showed that crossability varied non only with autotetraploid species but also with different botanical forms of *A.hypogaea* (Table 3).

The resistant reaction of these plants to rust ranged from 2.1 to 2.4. Based on yield and disease reaction a number of *A.hypogaea* like derivatives were identified for further study with the object of getting plants with high yield potential combining disease resistance through autopolyploid route.

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