

A New Interspecific Hybrid in the Genus *Arachis*:

by

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Interspecific crosses in the genus *Arachis* have been reported by several workers. The earliest cross appears to have been made between *A. rasteiro* and Holland Jumbo (Ann. Rep. 1947). *A. hypogaea* and *A. villosa* have been successfully crossed by Krapovickas and Rigoni (1951), D' Cruz (1956), and Raman (1959). Other interspecific crosses involving *A. hypogaea*, *A. monticola* and other wild species, not named then, have also been reported by Raman (1958, 1959 a, b, c, 1960). John *et al* (1954) reported to have made several successful crosses among three species, viz. *A. rasteiro*, *A. nambyquarae* and *A. hypogaea*.

An interspecific hybrid between *A. nambyquarae* and *A. monticola* has been synthesized at the Groundnut Research Station, Mainpuri (U. P.). The distinguishing morphological characters of the hybrid in F₁ and the inheritance of characteristic reticulation on the pod of *A. nambyquarae* in F₂ and F₃ generations has been studied and described in this paper.

A. monticola bears a finely interwoven and prominent reticulation commonly found in many cultivated varieties of *A. hypogaea*. On the other hand *A. nambyquarae* is singled out on account of its peculiar furrow shaped, long and deep reticulations. In the former it may be called 'Notted' while in the latter it may be given the name 'Furrowed'.

Observations: The F₁ hybrid was found to have many characters intermediate between the two parents. Growth habit, leaves, flowers, pods and seeds are all intermediate. The F₂ progeny consisted of 200 plants. The segregation of pods on the basis of reticulation has been given in Table 1. The F₁ hybrid showed dominance of 'netted' reticulation over the 'furrowed' one. The F₂ population segregated into 13-netted : 3-furrowed ratio. The small chi-square values constitute very substantive evidence for consistency of the ratio expected.

Out of the total 30 F₂ families with 'netted' reticulation studied in F₃ generation, 21 bred true for this character, 3 segregated in the ratio of 3-netted : 1-furrowed and the remaining 6 in the ratio of 13-netted : 1-furrowed. Among the 16 F₂ 'furrowed' families, 6 did not segregate while the rest 10 gave a ratio of 1-netted : 3-furrowed. In the chi-square tests the fit is found to be good in all the cases. Thus conviction of an F₂ inhibitory ratio gets confirmed from the behaviour of the F₂ families in F₃ generation, as these ratios are also expected from the theoretical assumptions of the segregations of the F₂ families of different genotypes in the F₃ generation.

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TABLE 1 showing segregations in F_2 & F_3 generations

Cross	Generation	Parents reticulation	Number of families studied	Total number of plants	Actual number obtained		Expected ratio	Calculated number		χ^2	Value of 'p'
					Netted	Furrowed		Netted	Furrowed		
<i>A.nambyquarae</i>	F_2	Netted	4	200	166	34	13:3	162.50	37.50	0.4020	.70-.50
<i>A.monticola</i>	F_3	"	21	381	All	—	—	—	—	—	—
"	"	"	3	57	42	15	3:1	42.75	14.25	0.0527	.90-.80
"	"	"	6	78	63	15	13:3	63.37	14.62	.0118	.95-.90
"	"	Furrowed	6	123	—	All	—	—	—	—	—
"	"	"	10	143	38	105	1:3	35.75	107.25	.1888	.70-.50

Symbolising the gene for furrowed with Nt and that for netted with nt and supposing the presence of a factor 'I' to play the role of an inhibitory factor the genotypes proposed for the two parents and the hybrids in successive generations would be as follows:—

P_1 *A. nambyquarae* × *A. monticola*
 Furrowed (ii Nt Nt) Netted (II nt nt)

F_1 Netted (Ii Nt nt)

F_2 Netted 13 : Furrowed 3

F_2 reticulate	F_3 genotype		F_3 segregation ratio	
			Netted	Furrowed
Netted	I I	Nt Nt	All	—
	I I	Nt nt	"	—
	I I	nt nt	"	—
	I i	nt nt	"	—
	i i	nt nt	"	—
	I i	Nt Nt	3	1
	I i	Nt nt	13	3
Furrowed	i i	Nt Nt	—	All
	i i	Nt nt	1	3

Discussion: A bifactorial difference between the genotypes of the two parents, viz. *A. nambyquarae* H. and *A. monticola* for reticulation characters of the shell resulting in an inhibitory ratio of 13 : 3 is analogous to the ratio reported by

Sinnot *et al* (1958) in his classical example of gene interaction in poultry. The inhibitory factor I which inhibits the action of the colour producing factor C in the poultry interacts in a similar way with Nt to produce a netted-reticulation in *Arachis* which otherwise produces a furrowed-reticulation in the absence of I

The possibility of a monohybrid ratio of 3:1 in the present case is completely ruled out as the furrowed phenotype from F₂ generation segregates in F₃ to produce a ratio of 1 furrowed: 3 netted.

Summary: (1) An interspecific hybrid between *A. nanbyquarae* and *A. monticola* has been synthesised. (2) The important morphological characters of the F₁ hybrid have been compared with those of the parents and (3) The inheritance of 'netted' and 'furrowed' reticulations have been studied. In F₂ a dihybrid inhibitory ratio of 13 (netted): 3 (furrowed) has been recorded and further confirmed in F₃ generation.

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