

Research Reports

Genetics and Plant Breeding

Improved Groundnut Variety Released for Cultivation in Southern Vietnam

Ngo Thi Lam Giang¹, Phan Lieu¹, Tran Minh Nam², Tran Dinh Long³, Vu Tuyen Hoang⁴, and S L Dwivedi⁵ (1. Oil Plant Institute of Vietnam, Ho Chi Minh City, Vietnam; 2. University of Ho Chi Minh City, Vietnam; 3. National Institute of Agricultural Science (INSA), Hanoi, Vietnam; 4. Institute of Food and Foodstuff Crops, Hanoi, Vietnam; and 5. Genetic Enhancement Division, ICRISAT Asia Region, Patancheru 502 324, Andhra Pradesh, India)

Groundnut (*Arachis hypogaea* L.) is one of the important annual oil crops with high economic value in Vietnam. While the groundnut area in Vietnam in 1993 was 235 000 ha, it increased to 250 000 ha in 1995. The eastern region of southern Vietnam accounts for about 31.7% (74700 ha) of the total area in the country. The major groundnut regions in southern Vietnam are Ho Chi Minh City territory and Tay Ninh, Song Be, Long An, and Dong Nai provinces.

In Ho Chi Minh City territory and Tay Ninh province, groundnut is grown under irrigated conditions. The average pod yields are 2.2 t ha⁻¹. However, several farmers harvest pod yields of 3.0–3.5 t ha⁻¹ under good crop management conditions. In the Song Be, Dong Nai, and Long An provinces, the crop is mainly grown under rain-fed conditions. The average pod yields are 1.2 t ha⁻¹. The major cropping patterns involving groundnut are groundnut-groundnut-rice and groundnut-rice-rice. Groundnut

is mainly grown in winter-spring (Nov–Mar) and summer-autumn (Mar–Jun) seasons. In the rainy season, it is grown to produce seed for the following winter-spring season crop. The short-duration (90 days) and spanish bunch types, LY, Mokat, and Giay are the cultivars commonly grown by the farmers. Of these, LY is widely adapted and the most preferred one.

In Vietnam, there is no organized seed sector (government or private) responsible for groundnut seed production and maintenance of varietal purity. In general, farmers maintain their own seed stocks for sowing. In case the seed is not sufficient, they purchase whatever seed is available in the market and grow it with their own seed. The original LY, for example, had 2-seeded, small, smooth pods with a thin shell and tan colored seeds; Vietnamese farmers now grow LY that produces a mixture of pod types.

The Oil Plant Institute of Vietnam (OPI) is the principal groundnut research institution in southern Vietnam. It initiated a project in 1989 with the Tay Ninh province, Ho Chi Minh City, and ICRISAT to purify and select improved types from the local LY population. OPI collected 500-g, bulk pod samples from 20 locations each in Cu Chi under Ho Chi Minh City territory, Trang Bang and Go Dau districts in the Tay Ninh province, and from the Song Be town in the Song Be province. These samples were bulked, and the resulting seed was grown in Cu Chi. One thousand plants were randomly harvested. Of these, only 400 plants were selected based on the pod and seed characteristics of LY. These 400 single plants were progeny rowed in the following season. Twenty progeny bulks with superior pod/seed characteristics were retained for evaluation. Finally, three progeny bulks (LY 1, LY 2, and LY 3) were compared with the local LY. These selec-

Table 1. Pod yield (t ha⁻¹) of VD 1 and control cultivar LY, southern Vietnam, 1991/92–1994/95 winter-spring seasons¹.

Variety	1991/92	1992/93	1993/94		1994/95		Average
	Cu Chi	Cu Chi	Cu Chi	Trang Bang	Trang Bang	Cu Chi	
VD 1	3.69	3.59	4.03	3.50	2.63	3.21	3.44
LY (control)	3.03	3.13	3.46	3.01	2.18	2.79	2.93
SE	±0.201	±0.138	±0.082	±0.100	±0.107	±0.102	
CV(%)	12	4	4	6	9	7	

1. The trial comprised 4 varieties including the control.

tions were evaluated for pod yield, shelling percentage, sound mature seed, 100-seed mass, and oil content during the 1991/92 to 1994/95 winter-spring seasons. In 1995, based on overall performance, LY 1 was released as VD 1 for cultivation in southern Vietnam, by the Ministry of Agriculture and Rural Development (MARD).

In 4 years of yield trials conducted in farmers' fields in Cu Chi and/or Trang Bang during the 1991/92 to 1994/95 winter-spring seasons, VD 1 recorded an average pod yield of 3.44 t ha⁻¹ compared with 2.93 t of the local LY (Table 1). VD 1 had 77% shelling, 90% sound mature seed, 42 g 100-seed mass, and 47% oil content (Table 2).

Table 2. Ancillary data of VD 1 and control cultivar LY, southern Vietnam, 1991/92–1994/95 winter-spring seasons¹.

Variety	Shelling (%)	Sound mature seeds (%)	100-seed mass (g)	Oil content (%)
VD 1	77	90	42	47
LY (control)	76	88	40	44

1. Average of six locations.

VD 1 belongs to subspecies *fastigiata* var *vulgaris*. It has an erect growth habit with medium-sized, light green, oblong-to-elliptic leaves and yellow flowers. The plants have 4–6 primary and 4–8 secondary branches. Pods are mostly 2-seeded and round, without a beak, but with a slight constriction and no/slight pod reticulation. The average pod length and width are 25 and 14 mm. The seeds are tan in color and round. The average seed length and width are 12 and 9 mm. Compared with the pods of local LY, VD 1 has round and relatively bigger pods.

Vietnamese farmers liked VD 1 because of its short duration (90 days), high pod yield, and good adaptation to acidic soil conditions. OPI has taken up seed production and distribution to the farmers in Ho Chi Minh City territory and Tay Ninh province.

Breeding an Early-maturing and High-yielding Groundnut Variety—Nonghua 22—in China

Liushen Gao, Zixin Jiang, Biguang Long, Fuzhen Feng, and Fangdi Deng (China Agricultural University, Beijing 100094, China)

The North China Plain is an important groundnut-producing region in China, accounting for 13.7% of the groundnut area and 10.5% of the country's production. However, this area is the largest low-yield area and its productivity is 86.8% of the country's average. With 3500°C cumulative temperature, and 500–600 mm precipitation, the North China Plain has inadequate heat and rainfall for a double crop each year. The groundnut cropping system is changing from spring groundnut to summer groundnut/winter intercropping.

Due to the lack of resources, breeding programs in the plain relied heavily on introductions. All groundnut varieties grown in the plain were introduced from other districts of the country. Traditional varieties were used before the 1970s. Such new varieties as Bash 1016, Xuzhou 68-4, Haihua 1, Hua 37, and Luhua 9 were introduced into this area after the 1980s, and they have greatly increased the region's groundnut yield and quality. However, these varieties have a longer growing period and are not suitable for intercropping. In recent years, the varieties have degenerated due to the inadequate multiplication system, and no attention has been paid to their purification. The absence of a suitable new variety is becoming the critical limitation to increasing output in this groundnut production area.

The groundnut breeding group at the China Agricultural University (CAU) started breeding new varieties in 1979. After 10 years of research, several early-maturing and high-yielding groundnut varieties, such as Nonghua 10, Nonghua 16, and Nonghua 22, have been bred and are now used in production. This paper reports the breeding and extension of Nonghua 22.

Nonghua 22 is derived from a cross of Hua 31 and Fu 50 made in 1980. It was selected following the pedigree method. During 3 years of cooperative varietal tests from 1991 to 1993, Nonghua 22 gave an average pod yield of 4.2 t ha⁻¹, 15.2% more than the control variety Hua 37.

In demonstration trials during 1992/93, yields were higher than those of control varieties (Table 1). Propagation and demonstration trials of intercropping with winter wheat were done in the Yi Xian county, Hebei province, in 1994; the average yield of Nonghua 22 was 5.3 t ha⁻¹. The highest-yielding plot recorded 6.8 t ha⁻¹.