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# Elite Groundnut Germplasm Lines

ICGV 86252, ICGV 86393, ICGV 86455, ICGV 86462

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- High-yielding, jassid-resistant breeding lines
- Average oil content 46-49%
- Average 100-seed mass 41-50 g
- Mature in 112-120 days in the rainy season



ICRISAT

**Plant Material Description no. 47**

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ICGVs 86252, 86393, 86455, and 86462 are high-yielding, jassid-resistant breeding lines with agronomic characteristics superior to those of their jassid-resistant parents, NC Ac 2214 and NC Ac 2240. They are also less susceptible to thrips.

## Origin and Development

These breeding lines were developed using the bulk pedigree method, from crosses made in 1982 between high-yielding breeding lines/cultivars and jassid-resistant germplasm sources. The jassid resistance sources, NC Ac 2214 (ICG 5040) and NC Ac 2240 (ICG 5043), are also resistant to thrips and termites, but have several undesirable agronomic traits including low yield potentials. The pedigrees of the breeding lines are:

ICGV 86252 = (ICGS 7 x NC Ac 2214) F<sub>2</sub>-B<sub>1</sub>-B<sub>2</sub>-B<sub>2</sub>-B<sub>3</sub>-B<sub>3</sub>

ICGV 86393 = (J 11 x (M 13 x NC Ac 2214)) F<sub>2</sub>-B<sub>1</sub>-B<sub>1</sub>-B<sub>1</sub>-B<sub>1</sub>-B<sub>2</sub>

ICGV 86455 = (Kadiri 3 x (M 13 x NC Ac 2214)) F<sub>2</sub>-B<sub>1</sub>-B<sub>1</sub>-B<sub>1</sub>-B<sub>2</sub>-B<sub>2</sub>

ICGV 86462 = (ICGS 1 x NC Ac 2240) F<sub>2</sub>-B<sub>2</sub>-B<sub>2</sub>-B<sub>3</sub>-B<sub>4</sub>-B<sub>2</sub>

## Description

ICGVs 86252, 86455, and 86462 belong to the sequentially branching group (subsp *fastigiala* var *vulgaris*), and ICGV 86393 to the alternate branching group (subsp *hypogaea* var *hypogaea*). Details of plant characters of these lines are given in Table 1. They have mainly 2-1 seeded pods with pod beak none to slight, pod constriction slight to moderate, and ridges none to moderate. Pod reticulation is slight to moderate in ICGV 86252 and

**Table 1. Plant characters of jassid-resistant breeding lines ICGVs 86252, 86455, 86462, and 86393.**

Character	ICGV 86252	ICGV 86455	ICGV 86462	ICGV 86393
Growth habit	Decumbent-3	Decumbent-3	Decumbent-3	Decumbent-3
Branching pattern	Sequential	Sequential	Sequential	Alternate
Leaf shape and color	Elliptic, dark green	Elliptic, dark green	Elliptic, dark green	Elliptic, dark green
Leaf appearance	Waxy	Normal	Waxy	Normal
Average height of main axis (cm)	20.6	11.6	18.2	14.0
Average canopy breadth (cm)	54.1	31.9	47.6	34.5
Average number of primary branches	5.1	4.3	5.1	4.2
Average number of secondary branches	2.2	2.1	2.2	17.5
Maturity in rainy season (average, days)	120	112	112	120
Maturity in post-rainy season (average, days)	131	131	131	134
Average number of trichomes on midrib and lamina of leaf <sup>1</sup>	3234	3779	2622	2251
Average number of trichomes on 1 cm leaf margin <sup>1</sup>	263	356	256	288

1. Average number of trichomes on midrib and leaf lamina were 754, 10 861, and 22 387 for ICGV 87123, NC Ac 2240, and NC Ac 2214, respectively. Trichome numbers on 1 cm leaf margins were 166, 363, and 612, respectively.

ICGV 86455, smooth to slight in ICGV 86393, and slight in ICGV 86462. Shelling percentage in two trials ranged from 62 to 69%, and 100-seed mass from 41 to 50 g. These lines have tan colored seeds (deep purple in the parents) with oil content averaging 46-49%. The oil quality of ICGV 86455 (oleic/linoleic (O/L) acid ratio = 1.3) and ICGV 86462 (O/L acid ratio = 1.2) was better than in the other two lines (0.97-0.98).

## Performance

In a trial conducted over four seasons at ICRISAT Center and other locations in India, these breeding lines were compared with three controls—ICGV 87123 and Kadiri 3 (both released cultivars), and NC Ac 343 (ICG 2271), a high-yielding breeding line from North Carolina, USA, with multiple resistance to insect pests. Pod yields were similar in the rainy season; but in the postrainy season the elite breeding lines yielded about 1 t ha<sup>-1</sup> more than the controls (Table 2).

ICGVs 86252, 86393, 86455, and 86462 were also compared with their jassid-resistant parents for agronomic traits and jassid resistance in a separate trial conducted for four seasons at ICRISAT Center. ICGVs 86252, 86393, and 86455 gave, on average, 113-132% greater pod yields, 15-25% higher 100-seed mass, and marginally better shelling percentages than NC Ac 2214. Similarly, ICGV 86462 produced 281% greater pod yield, about 6% higher shelling percentage, and marginally higher 100-seed mass than NC Ac 2240.

The average jassid damage score, on a 1-9 scale, ranged from 1.6 to 2.2 in the breeding lines and from 7.5 to 8.0 in the susceptible controls, ICGV 87123 and Kadiri 3; NC Ac 343 scored 3.7 (Table 2). In the trial with the resistant parents, jassid damage score in the breeding lines ranged from 1.7 to 2.2 (1.3 in the parents).

**Table 2. Performance of four jassid-resistant groundnut breeding lines in the rainy and postrainy seasons, 1988-90, ICRISAT Center and other locations in India.**

Breeding line	Average pod yield (t ha <sup>-1</sup> )		Jassid damage score <sup>3,4</sup>	Shelling percentage <sup>4</sup>	100-seed mass (g) <sup>4</sup>	Oil content (%) <sup>5</sup>
	Rainy season <sup>1</sup>	Postrainy season <sup>2</sup>				
ICGV 86455	1.98	3.07	2.2	62	42	48
ICGV 86393	1.97	3.50	2.2	64	43	46
ICGV 86462	1.88	3.09	2.1	65	41	49
ICGV 86252	1.76	3.04	1.6	66	42	48
<b>Controls<sup>6</sup></b>						
ICGV 87123	1.75	2.02	7.5	65	45	49
Kadiri 3	1.61	2.31	8.0	66	46	48
NC Ac 343	1.81	1.73	3.7	63	50	49

1. Average of 11 locations in two rainy seasons (1988 and 1989).
2. Average of 5 locations in two postrainy seasons (1988/89 and 1989/90).
3. Jassid damage scored on a 1-9 scale under natural infestation in the field, where 1 = highly resistant, 2-3 = resistant, 4-5 = moderately resistant, 6-7 = susceptible, and 8-9 = highly susceptible.
4. 5. Average of 7 and 4 locations respectively.
6. Controls ICGV 87123 and Kadiri 3 are susceptible; NC Ac is resistant.

## Plant Material Descriptions from ICRISAT

Leaflets in this series provide brief descriptions of crop genotypes identified or developed by ICRISAT, including:

- germplasm accessions with important agronomic or resistance attributes;
- breeding materials, both segregating and stabilized, with unique character combinations; and
- cultivars that have been released for cultivation.

These descriptions announce the availability of plant material, primarily for the benefit of the Institute's cooperators. Their purpose is to facilitate the identification of cultivars and lines and to promote their wide utilization. Requests should be addressed to the Director General, ICRISAT, or to appropriate seed suppliers. Stocks for research use issued by ICRISAT are sent to cooperators and other users free of charge.

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