Table 3. Mean performance for agronomic traits of chickpea variety Dilaji and control varieties during 1992/93 to 1994/95 under rainfed conditions in Diphu, Assam, India.

Variety	Days to maturity	Plant height (cm)	Primary branches plant^{-1}	Pods plant^{-1}	100-seed mass (g)	No. of seeds pod^{-1}	Protein content (%)
Dilaji	126	52	2–5	95	16.78	1.1	19.0
C 235	132	61	2–4	77	13.36	1.0	18.2
PBG-1	129	60	2–4	62	13.82	1.0	18.5

(postrainy season) 1996/97. On the basis of results of both on-station and on-farm trials ICCV 89314 was recommended for the zone and has been released by the State Variety Release Sub-committee as 'Dilaji'. This line was developed from the cross ICCL 80074 × ICCC 30 at ICRISAT, Patancheru, India using bulk-pedigree method and its selection number was ICCX-810098-BP-BP-77P-BP. The flower is pink; the seed is brown and angular. Anthocyanin pigmentation is present in the stem, branches, and leaves.

The yield performance of Dilaji was evaluated in various trials conducted in the zone. Dilaji produced an average yield of 1.46 t ha^{-1} while C 235 gave 1.07 t ha^{-1} and PBG-1 produced 0.94 t ha^{-1} (Table 1).

There was no significant difference in fusarium wilt incidence and pod borer reaction of Dilaji and the control variety (C 235) (Table 2). But Dilaji was promising for other quantitative traits. The protein content of Dilaji was high (19.0%) (Table 3). Therefore, this new desi variety offers a better opportunity to the farmers of the Hill Zone for adopting double cropping to augment their economic growth and also increase the total pulse production of the region.

Development of a Short-duration Chickpea for the Subtropics

Jagdish Kumar[1], R K Pannu[2], and B V Rao[1] (1. International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru 502 324, Andhra Pradesh, India; 2. CCS Haryana Agricultural University, Hisar 125 004, Haryana, India)

The success of short-duration chickpea (*Cicer arietinum*) varieties in tropical environments in India and Myanmar could be repeated in subtropical regions if short-duration genotypes are developed which tolerate/escape major abiotic and biotic stresses prevalent under these environments (Kumar et al. 1996). Saxena et al. (1997) described various abiotic stresses of chickpea in tropical and subtropical environments. A super early chickpea ICCV 96029 was developed at ICRISAT (Kumar and Rao 1996). This genotype was tested for two years (1997/98 and 1998/99) along with long-duration controls C 235 and Pant G-114 at ICRISAT, Patancheru (18° N) and CCS Haryana Agricultural University, Hisar (29° N), India respectively. The weather at Patancheru is warmer than at Hisar; this resulted in acceleration of development and crop maturity at Patancheru. The crop was planted in mid-October at Patancheru and in the beginning of November at Hisar.

The phenology data indicate that the super early genotype ICGV 96029 flowered 37 and 40 days earlier and matured 30 and 27 days earlier than controls at Patancheru and Hisar respectively (Table 1). The large difference between flower initiation and pod setting at Hisar is due to very low temperature (<5°C). Also, ICCV 96029 might have some mechanism of cold tolerance so that it was able to produce pods even in January as compared to Pant G-114 which started podding only in February. The duration of reproductive phase of ICCV 96029 is 7–13 days longer than the controls, which helped it to develop better sink that resulted in higher harvest index. The productivity in terms of seeds produced per unit time was also high in ICCV 96029 because of its short maturity duration.

ICCV 96029 may produce relatively high yields in subtropical environments represented by Hisar by escaping end-of-season stresses such as drought, pod borer damage, and leaf diseases. Kumar et al. (1996) suggested such an approach to realize increased productivity in subtropical environments. At Hisar, ICCV 96029 matured in mid-March when the weather was comparatively cooler (which helps in better sink development), and there was low incidence of pod borer. Pant G-114 matured under much warmer temperature in mid-April. The development of the short-duration, super early genotype ICCV 96029 could be useful for planting land vacated by late-maturing

Table 1. Performance of super early chickpea ICCV 96029 and long-duration controls at ICRISAT, Patancheru and CCS Haryana Agricultural University, Hisar, India 1997/98 and 1998/99.

Character	Patancheru[1]		Hisar[2]	
	ICCV 96029	C 235	ICCV 96029	Pant G-114
Days to first flower	24 ± 1.0	61 ± 0.5	43 ± 2.0	83 ± 3.0
Days to first pod	29 ± 0.5	69 ± 0.0	75 ± 4.0	107 ± 4.0
Days to maturity	79 ± 1.0	109 ± 3.5	128 ± 3.0	155 ± 2.0
Reproductive phase (days)	55 ± 2.0	48 ± 4.0	85 ± 4.0	72 ± 5.0
Plant height (cm)	40 ± 1.5	46 ± 6.0	54 ± 2.0	45 ± 6.0
Seed yield plant^{-1} (g)	14 ± 5.6	21 ± 4.7	17 ± 2.0	16 ± 4.0
Biomass plant^{-1} (g)	–[3]	–	43 ± 4.0	48 ± 9.0
Harvest index (%)	–	–	40.0	33.0
Productivity plant^{-1} day^{-1} (g)	0.18 ± 0.03	0.19 ± 0.04	0.13 ± 0.02	0.10 ± 0.03
Seed yield (kg ha^{-1})	1022 ± 84.0	1439 ± 222.5	1042 ± 58.0	2049 ± 166.0

1. Mean of two environments.
2. Mean of three environments.
3. Data not recorded.

rice (*Oryza sativa*) and cotton (*Gossypium* sp) which otherwise remains fallow. This genotype may also hold promise as a catch crop between early maturing rice and wheat (*Triticum aestivum*), the most prevalent cropping system in northwestern parts of India. At present ICCV 96029 is the best source of earliness and can be used in breeding programs. The seed of this genotype is maintained at the Genetic Resources and Enhancement Program (GREP) of ICRISAT and is available on request.

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Desierto 98 and Tequi 98: New Kabuli Chickpeas for Northwestern Mexico

J A Morales (Agricultural Experimental Station, Hermosillo Sonora, Apdo Postal 1031, Mexico)

The area of kabuli chickpea (*Cicer arietinum*) in Mexico is 120,000 ha; the average yield is 1.5–1.8 t ha^{-1}. Kabuli chickpea is cultivated in the states of Sonora (20%), Sinaloa (75%), and Baja California South (5%). About 90% of chickpea is grown with irrigation and 10% on residual moisture. The chickpea crop is attacked by soil diseases such as fusarium wilt (*Fusarium oxysporum* f. sp *ciceris*) and wet root rot (*F. solani*). Good sources of resistance to diseases have been found (Muehlbauer and Singh 1987). Improved resistant varieties have been released (Sono et al. 1995). The National Institute of Agricultural and Livestock Research (INIFAP) in Mexico started a program for breeding disease resistant kabuli chickpea at the Experimental Station in Hermosillo Sonora. The ICRISAT/ICARDA desi chickpea germplasm lines, L-4294 and L-1794, which are disease resistant were crossed with local and Spanish kabuli chickpeas to develop the disease resistant kabuli varieties Desierto 98 and Tequi 98.

Desierto 98 was developed from the cross (L-1794-Mac × Sur) × Bco Lechoso made in 1986, following bulk