

Table 2. Reaction to fusarium wilt in wilt sick plot of chickpea cultivar Vijay at Mahatma Phule Krishi Vidyapeeth, Rahuri, Ahmednagar, Maharashtra, India, 1991/92–1994/95.

Entry	Wilt (%)				Mean
	1991/92	1992/93	1993/94	1994/95	
Vijay	11.60	7.12	9.14	7.63	8.87
Controls					
Phule G 12	13.81	35.68	31.26	29.10	27.46
BDN 9-3	26.71	-	63.55	100.00	63.42
JG 62	100.00	100.00	100.00	100.00	100.00
(Susceptible)					

Table 3. Reaction to pod borer *Helicoverpa armigera* at Mahatma Phule Krishi Vidyapeeth, Rahuri, Ahmednagar, Maharashtra, India, 1991/92–1994/95.

Entry	Pod damage (%)				Mean
	1991/92	1992/93	1993/94	1994/95	
Vijay	10.68	6.35	6.05	15.24	9.58
Controls					
Phule G 5	13.33	13.88	16.67	18.08	14.74
Phule G 12	12.54	11.53	8.92	16.82	12.45

deep. This variety has also been observed to be less damaged (9.58%) by the pod borer *Helicoverpa armigera* than the other varieties Phule G 4 (14.74%) and Phule G 12 (12.45%), released in Maharashtra (Table 3).

The cultivar Vijay can easily be distinguished from the existing cultivars in growth habit and leaf characters. It has a spreading plant type, small leaflets with waxy foliage; the seeds are wrinkled, yellowish brown and medium in size (20 g 100-seeds⁻¹).

Vijay has the following advantages over the previously released cultivars:

- approximately 20% more grain yield under rainfed, 17% under irrigated, and 65% under late-sown situations
- resistant to fusarium wilt (8.87% mortality)
- less damaged by the pod borer (9.58% damage)
- matures a week days earlier than other cultivars
- better milling quality

- better storage ability
- spreading growth habit, and therefore conserves soil moisture

Presumably, when cultivated widely, Vijay will add

Super-Early Chickpea Developed at ICRISAT Asia Center

Jagdish Kumar and B V Rao (ICRISAT Asia Center)

The shortest known duration chickpea in the world germplasm collection, ICCV 2, flowers in about 30 days at ICRISAT Asia Center (IAC), Patancheru (17°6'). The other common chickpea varieties like Kranti and Annigeri take about 45 days to flower. Earliness is an important character for adaptation to short-duration chickpea growing environments. This trait may help stabilize chickpea yields in long-duration environments also.

In a cross of two early-maturing chickpea lines, ICCV 2 and ICCV 93929, a transgressive segregant ICCV 96029, which flowers in about 23 days, was selected (Table 1). Single plant progenies in F₅ generation bred true. Observations indicate that the line has early growth vigor, is double-podded, and matures in around 75–80 days, one week earlier than ICCV 2, under rainfed conditions at IAC. Another line ICCV 96030 flowers in about 27 days.

ICCV 96029 appears to be a useful source for both earliness, and for drought escape in short-duration environments. Because of its earliness, the line has a potential to fit in cropping patterns as a catch crop. More importantly it may help extend chickpea cultivation to more drought-prone environments, than is possible at present. Such studies are being planned.

ICCV 96029 will be useful in genetic studies of earliness. It may be used to develop early lines for adaptation

Table 1. Days to first flower in super-early chickpea line ICCV 96029, and controls, ICRISAT Asia Center, Patancheru, 1995/96.

Chickpea line	Days to first flower
ICCV 96029	23±0.3
ICCV 96030	27±0.2
Controls	
ICCV 2	30±0.3
Annigeri	45±0.0

to subtropical environments, such as those in northern India, where the commonly cultivated varieties mature in 5–6 months, and are prone to several end-of-season constraints. Seed of this line is available for studies.

Determinate Growth in Chickpea

H A van Rheenen (ICRISAT Asia Center)

Legumes such as common bean, soybean, and pigeonpea can show either a determinate (DT) or indeterminate (IDT) growth habit. In chickpea, the occurrence of DT, whereby stem and branch apices terminate in flowers, has been reported recently by van Rheenen et al. (1994), but the DT plants were female sterile (FS). The character is controlled by two genes — *Cd*. to express the character, and *Dt* to express determinacy. As determinacy is potentially useful both under conditions of excessive vegetative growth, and severe drought, the search continued for DT fertile plants.

A seed lot from *Cd. Dt.* plants of ICCV 6 was exposed to 600 Gy gamma ray irradiation in 1993. Subsequently, 1000 well-yielding plants were selected from the 1993/94 population for progeny testing during 1994/95 at ICRISAT Asia Center.

It was hoped that the linked characters of DT and FS could be delinked or that a new mutation could produce DT-fertile plants. Although more than 3000 clearly determinate plants were inspected, none of these produced a single pod, suggesting DT and FS are pleiotropic char-



Figure 1. Further growth of chickpea branch arrested by terminal flower (T).

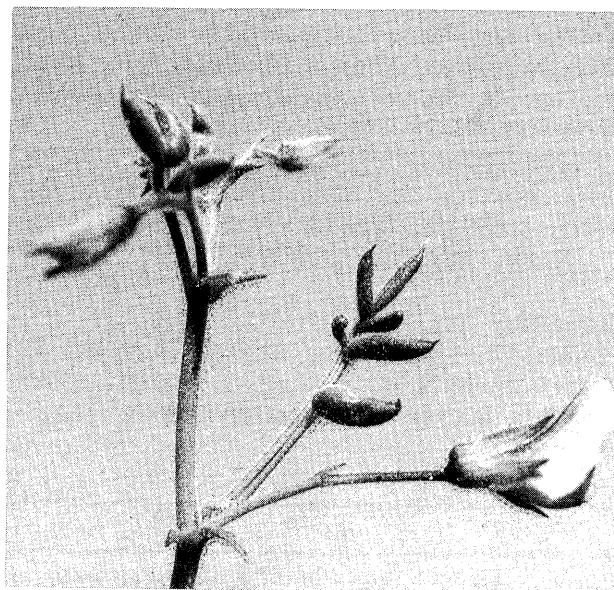


Figure 2. Malformed top leaves of chickpea variety K 850. Character named “twisted leaf” (TL) or “functional determinate” (FD).

acters. However, the progenies were also searched for new determinate plants that were fertile, and some putative desirables were selected (Fig. 1). However, it was difficult to be sure, on a single plant basis, that the selection was successful. Progeny testing will probably affirm or negate the character to be genetically controlled.

The detection of the DT trait in a large population is difficult because it may express itself only at a late stage, and insect damage could obscure its appearance. Several chickpea researchers have noted, first in K 850 (Fig. 2), but also in other cultivars, the character of malformed top leaves, which signals the arrest of further vegetative growth. This phenomenon is strongly environment-dependent. It is almost absent at ICRISAT Asia Center, Patancheru, and is common at Gwalior and Hisar, India, but only in parts of the branches of the plant. This trait has not been named in the literature, but while investigating its possible use in curbing excessive vegetative growth, we called it “twisted leaf” (TL) or “functional determinate” (FD). Researchers interested in seeds of DT or TL material may contact the author for samples.

Reference

van Rheenen, H.A., Pundir, R.P.S., and Miranda, J.H. 1994. Induction and inheritance of determinate growth in chickpea (*Cicer arietinum* L.). *Euphytica* 78:137–141.