

Desi Chickpea Variety

for rice-based cropping system of Indo-Gangetic plains

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CHICKPEA (*Cicer arietinum* L.) is cultivated in 45 countries globally. It is believed to have originated in south-eastern Turkey from the wild progenitor *Cicer arietinum* spp. *reticulatum*. The *desi* and *kabuli* are two botanical races of the cultivated chickpea distinguished mainly by seed characteristics. The *desi* type are also known as Bengal gram and are confined almost entirely to the Indian sub-continent where they are used mainly as split *dhal* or flour (*besan*). The *desi* types are also grown in Ethiopia, East African Highlands, Mexico and more recently in Australia. The *kabuli* types are known as Garbanzos. These are cultivated in Afghanistan through West Asia to North Africa, Southern Europe and the Americas. In the Indian sub-continent the *kabuli* types were introduced in 1700 A.D. In India, these types contribute to about 10 to 15% of the total production.

The Indo-Gangetic Plains (IGP) was traditionally a pulse bowl and average productivity of pulse crops were higher in this region; however, the green revolution had impacted the total pulse production in the northern India which has shown a decreasing trend in 1970s. The area under pulse crops particularly of

chickpea in *rabi* season was replaced largely by wheat and of pigeonpea by rice in *kharif* due to the increase in assured irrigation.

There is great scope for diversification of rice-based cropping system by rice-chickpea rotation in rainfed rice fallows where water is now a limiting factor. This would improve the soil health in the IGP and increase the total pulse productivity.

Pant Gram-186 developed at GBPUAT, Pantnagar and released for late sown situation of Uttar Pradesh in the year 1997 is now being

cultivated vary widely in rice-based cropping system in IGP. For the development of Pant Gram-186 two pronged strategy was followed.

- To modify the plant type of released variety of *desi* chickpea crosses were made between the *desi* and *kabuli* cultivars.
- Plants/progenies (F_2 through F_4) selection in the timely sown condition for this seeding was done between November 15 and 25. The F_5 progenies were evaluated in timely and late sown conditions (the seeding was done after the harvest of rice between



Pant Gram-186 grown in late sown condition at Pantnagar

In the Indo-Gangetic Plains the rice-wheat rotation is a rule and covers 8 to 10 m ha irrigated area in Punjab, Haryana, Uttar Pradesh, Bihar and West Bengal. This cropping system has caused deterioration of soils, declining water table, frequent outbreaks of insect pest and disease epidemics due to lack of crop/varieties heterogeneity and other environmental hazards (like excessive use of agro-chemicals has led to pollution of air and underground water). This has necessiated the diversification of rice-wheat rotation and inclusion of pulse crop or replacement of cereal crop by a pulse.

November 26 to December 15). Preference was given to select plants/progenies of semi-spreading (semi-determinate) growth habit with large pod-bearing length, small seeds, early seedling vigour and resistance to major diseases. These traits were desirable for rice-based cropping system where chickpea is grown either in rainfed rice-fallows or in late sown condition (i.e. after harvest of rice or seeding of chickpea in standing rice crop 7 to 10 days prior to harvesting, called *utera* or *para* crop).

It was developed from a cross of ILC-613 x Pant G-114. ILC-613 is a tall *kabuli* line from Tunisia. Pant G-114 is small seeded released variety of *desi* chickpea. One of the progenies of this cross, PG 88-6 was identified as potential genotype for rice-based cropping system. It was evaluated in multilocational replicated yield trials (i.e. adaptive varietal trials) in Uttar Pradesh and All India Coordinated Varietal Trials for three years (1991-92 to 1993-94) under timely and late

sown conditions. PG 88-6 has given significantly higher yields than Pant G-114, KPG-59 (Udai) and Avrodhi, the released check varieties in these trials. Some of the important traits are as follows.

- It has semi-spreading growth habit and early seedling vigour. Plant height is between 60 to 70 cm.
- It matures in about 145 days when timely sown and in 126 days in late sown situation.
- Plants are profusely podded (45 to 60 pods/plant), pods contain 1 to 2 seeds.
- It has small (100 seed weight is 15 to 17 g) and attractive yellowish brown wrinkled seeds which fetches higher price in the market as compared to other varieties of *desi* chickpea.
- It is tolerant to Botrytis grey mould (GBM) and wilt diseases and tolerant to pod-borer.
- Average yield of Pant Gram-186 is 20 to 25 qtls/ha.
- Proximate composition (per 100 g as is basis) showed maximum

moisture (12.35%), crude protein (22.29%), crude fat (2.7%), total ash (3.16%), crude fibre (5.64%), carbohydrate (59.50%) and 351 (Kcal) energy.

SUMMARY

Based on its yielding ability, resistance to major diseases and desirable seed traits Pant Gram-186 was released for cultivation in Uttar Pradesh for late sown condition in the year 1997. It has been a great contributor to diversification rice based cropping system in rainfed rice fallows.

Now it is being cultivated in Bihar, Jharkhand, Chattisgarh, Uttarakhand, Uttar Pradesh and West Bengal which covers the areas of North-West Plain Zone, North-East Plain Zone and also of Central Zone of the country. This is a ruling variety of rice-based cropping system for the past 20 years.

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