

having specific characteristics to cooperators for evaluation, use in breeding and, if promising, finishing for release.

- c. To identify differences in adaptation among lines regionally and internationally through multilocation testing, and to characterize environments in which chickpeas are grown.
- d. To promote international cooperation through personal visits and exchange of information

We offer the following nurseries and trials for 1979-80:

- a. International Chickpea Cooperative Trial: Desi - Short duration (ICCT-DS)
- b. International Chickpea Cooperative Trial: Desi - Long duration (ICCT-DL)

The entries included in these trials are superior cultivars and lines developed by national programs and ICRISAT scientists. Each of these trials includes 16 entries in four replications. The plot size is six rows, each 4 m long.

- c. International Chickpea Screening Nursery Desi - Short duration (ICSN-DS)
- d. International Chickpea Screening Nursery Desi - Long duration (ICSN-DL)

ICSN-DS has 60 and ICSN-DL has 80 test entries that are advanced breeding lines developed at ICRISAT. The nurseries are unreplicated, planted in an augmented design, with three checks in each at the beginning and end, and after every 10 entries. The plot size is two rows, each 4 m long.

- e. Early Generation Segregating Bulk Trials
- These include F<sub>2</sub> trial with 50 entries (46 populations and four checks) and F<sub>3</sub> trial with 16 entries (12 populations and four checks) in three replications each.

In addition to these tests, we supply on request any parental and/or segregating material to interested individuals or organizations for research work anywhere.

- Jagdish Kumar (ICRISAT).

### International Yield Trials and Nurseries Coordinated by ICARDA

ICARDA started systematic international trials in 1977-78 with generally the same objectives as those listed for ICRISAT. From two types of nurseries sent to 21 cooperators in 13 countries the first year, the program has grown to five types of trials/nurseries sent to 51 cooperators in 28 countries. The present trials are:

	Trial/Nursery	Locations	Countries
CAT	Chickpea Adaptation Trial	40	21
CIYT	Chickpea International Yield Trial	43	21
CIYT-W	Chickpea International Yield Trial - Winter Planting	15	9
CISN	Chickpea International Screening Nursery	40	23
CIF4T	Chickpea International F <sub>4</sub> Trial	25	13

- K.B. Singh (ICARDA).

### Rapid Generation Turnover

To speed up the breeding program we are investigating conditions necessary for shortening generation time in chickpea. Work elsewhere has shown that chickpea is a quantitative longday plant, and that earlier flowering can be induced by increasing daylength.

With an early cultivar, CPS-1, planted at ICRISAT Center in mid-December, time to flowering was reduced by 10 days when daylength was increased to 24 hours by use of artificial lights. A further gain of 3 days was achieved with foliar nutrient (N+P) sprays. A second experiment was planted in mid-January with 18 cultivars that would take from 32 to 74 days to flower in a normal rabi season. All 18 cultivars, at 24-hour daylength, flowered in 32 to 34 days, and produced mature seed. Under normal daylength, (12 hours) only the early cultivars flowered and matured; midlate and late cultivars were killed by high temperatures before they could flower. The average germination of seeds harvested 62 days after planting from all the cultivars subjected to 24-hour days was 94.7 percent. Earlier harvests did not give satisfactory germination. There appeared to be no advantage of continuing 24-hour days beyond flowering.

Thus the life cycle of chickpeas can be substantially shortened by exposure to 24-hour days up to flowering. Further investigations on the optimum time for starting longer days and minimum number of inductive

cycles required for floral initiation are underway.

- S.C. Sethi (ICRISAT).

## Off-Season Plantings, ICARDA

Growing two generations per year is important to the progress of chickpea breeding programs. Preliminary trials were conducted by ICARDA at three West Asia locations in 1978, and the crop was satisfactory at all locations when planted in June. In the summer of 1979, 2 ha were planted at Terbol, Lebanon, during the last week of June, and a satisfactory crop of the breeding material was produced.

- K.B. Singh (ICARDA).

## Off-Season Plantings, India

ICRISAT grew 1 ha of breeding material during the summer of 1979 at Taparwaripura, Kashmir. The site and planting time were chosen on the basis of 3 years' tests at several locations. The crop was satisfactory, maturing in time for planting in mid-October at ICRISAT Center, thus giving us two generations in a year.

- C.L.L. Gowda (ICRISAT).

## Male Sterility

Two naturally occurring male-sterile plants were noticed in the F<sub>2</sub> population of Annigeri x PM-L-550 during 1976-77 season. Crossing these plants with G-130 (the only cultivar flowering then) resulted in pod set. The F<sub>1</sub> was fully fertile and meiosis was normal. Inheritance of this character is being determined by growing F<sub>2</sub> and F<sub>3</sub> generations. Cytological and embryological studies on male-sterile plants to investigate the cause(s) of sterility are planned. Preliminary observations in the F<sub>2</sub> indicated that male sterility was partial, and segregation was not clear cut.

- S.C. Sethi (ICRISAT).

# Physiology/Agronomy

## Winter Planting

In the Mediterranean region of West Asia, North Africa, and South Europe, chickpea is

grown as a spring-sown crop. Preliminary screening of 200 lines in Lebanon in 1974-75, and more recently of over 3000 germplasm lines at Tel Hadia (Syria) and Terbol (Lebanon) in winter plantings, indicated that chickpeas could survive the severe cold weather and give much higher yields than the succeeding spring-sown crop.

The main threat to the winter-planted chickpeas was the damage by blight (*Ascochyta rabiei*). This disease could be controlled by fungicides, but the safest and cheapest control would be by genetic resistance.

The advantages of winter sowing are (a) higher yields resulting from better moisture availability and a longer growing season, and (b) the opportunity to extend chickpea culture to areas of lower rainfall than is required for the spring-sown crop.

With the identification of a number of lines with some resistance to blight, we have initiated the Chickpea International Yield Trial - Winter, and seed has been furnished to 15 locations in eight countries. Two of the most promising lines are being tested in farmers' fields in Syria.

- K.B. Singh and G.C. Hawtin (ICARDA).

## Survival of Desi Chickpeas in the Population of Kabuli Landraces

In most of the countries of West Asia and North Africa, the kabuli landraces of chickpea are cultivated. Often in the field population of these landraces, a few plants having pink flower are found. The number of these desi types is generally very small, often not exceeding 1 percent of the total population. Since there is a well-known human preference for kabuli types in the region, it is surprising that the desis should have survived in these populations.

An opportunity to look into the question of the existence of desis in the predominantly kabuli chickpea populations presented itself accidentally when a field trial planted in 1979 spring season with 'Lebanese Local' landrace of chickpeas at Terbol in the Beqa, a valley of northern Lebanon, showed very poor emergence because of the suboptimal soil physical conditions at the time of planting. This abandoned trial attracted attention when the emerged plants reached flowering stage and showed an unusually high proportion of pink-flowered plants in the population. Actual counts on 20 plots of the experiment are given in Table 1.