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_2 population of Annigeri × PM-L-550 during 1976-77 season. Crossing these plants with G-130 (the only cultivar flowering then) resulted in pod set. The F_1 was fully fertile and meiosis was normal. Inheritance of this character is being determined by growing F_2 and F_3 generations. Cytological and embryological studies on male-sterile plants to investigate the cause(s) of sterility are planned. Preliminary observations in the F_2 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.

Table 1. Frequency of pink-flowered plants in different plots planted with 'Lebanese Local' cultivar at Terbol during spring 1979

Plot Nos	Plants with pink flowers	Plants with white flowers	Total plants	Pink as percent of total
3716 to 3720	36	63	99	36.4
3721 to 3725	42	114	156	26.9
3816 to 3820	42	78	120	35.0
3821 to 3825	28	76	104	26.9
TOTAL	148	331	479	30.9

Averaged over all the plots, about 31 percent of plants in the whole population were pink-flowered. This percentage was much higher than that normally found in the area. In order to find out the actual population of desis in the original seed, a representative sample of that seed lot was examined and categorized into different classes based upon the seed appearance and seed coat characteristics. A few seeds from each class, the number varying according to seed availability, were planted under well-managed field conditions at the off-station multiplication site in Shawbak, Jordan, on 23 July 1979. The planting was done to determine differences in the field emergence and flower color of different classes and also to multiply seeds for controlled evaluation of viability and seed vigor. The data are shown in Table 2, page 6.

About 96 percent of the whole seed lot was constituted by typical kabuli type seed (Class A). Less than 1 percent was constituted by small, roundish seeds with white testa (Class B) that were not typically kabuli but would just pass in a kabuli lot because of similarity of color and to some extent shape. The larger, intermediate type with round shape and rough testa (Class C) constituted less than 0.2 percent of the whole lot, while the desi type with varied seed color (Class D, E and F) together constituted about 2.5 percent of the whole lot on a number basis. About 1.7 percent of the whole seed lot on weight basis consisted of immature seeds and foreign matter. The flower color behavior matched reasonably well with the seed appearance so far as categorization between desis, kabulis, and intermediate types was concerned.

In contrast to a population of only 2.5 percent of desis in the original seed lot, the actual field stand of desi types in the spring season trial at Terbol was about 30 percent. The logical inference from this comparison would be that the desi-type seed could withstand the adverse soil physical conditions relatively better than the kabuli-type seeds of this seed lot. And if this superiority is real, it might partly explain why the desi seeds have survived in the local populations of the landraces that might be frequently exposed to adverse conditions because of the uncertain nature of the mediterranean environment and soil conditions of the region.

Whether the observed differences in the germination of desis and kabulis were because of poorer initial seed vigor or owing to more exacting requirements for the factors of environment of the germinating kabuli seeds in comparison to the desis, cannot be said from this study. Since the germination test was carried out after a lapse of about 6 months from the time the field trial in Terbol was planted, the observed differences in the germination percentage of different classes might be attributed to differential loss in viability of each class over the period of storage, which in turn might reflect the difference in the initial seed vigor. A fair comparison of the seed vigor and the loss in viability can only be made by running regular germination and accelerated ageing tests on sufficiently large number of seeds of different classes. The limited number of seeds available in each class imposed major restriction on the above study. The multiplication of seeds in Shawbak this "off-season" would, however, permit better laboratory and

Table 2. Characteristics and relative proportion of different classes in the seed lot of the 'Lebanese Local' cultivar (landrace) and their field performance in Shawbak "off-season" nursery.

Class	Appearance of seed	100-seed weight (g)	Weight (g) in whole lot	Number in whole lot	Performance in Shawbak: No. planted	Germinated No.	Germinated percent	days to germination	Number of plants with: pink flower	white flower	intermediate flower
A	Normal kabuli type	34.50	1864.3	5400	10	4	40	10	0	4	0
B	Small, roundish, white	13.70	4.1	30	20	9	45	8	0	9	0
C	Large, intermediate, roundish, rough surface	33.30	3.3	10	7	4	57	9	0	2	2
D	Desi type, but whitish brown	22.70	23.6	104	40	32	80	7	31	1	0
E	Desi type, brown	24.00	6.0	25	16	14	87	8	12	1	1
F	Desi type, brown with blackish spots on the testa	26.75	3.7	14	10	9	90	10	9	0	0
G	Immature seeds	14.44	1.3	9	-	-	-	-	-	-	-
H	Foreign material	-	19.8	-	-	-	-	-	-	-	-

field evaluation of different classes of seeds in the future.

- M.C. Saxena (ICARDA).

Response to Plant Population Density

We have often observed that the plant populations in farmers' fields are generally lower than the recommended population. Where the growth duration is long, deficiency in plant population can be partly overcome by better growth in the remaining plants. However, such a response may be of a low magnitude in locations where growth duration is short. The ability to partially compensate for the reduction in yield at lower plant population is termed "plasticity". Plasticity is the comparative ability of a cultivar to produce more or less stable yields over a range of population densities. Breeding for plasticity may be of use in stabilizing yields at the farmer level.

We have found cultivaral differences in plasticity under conditions of short (ICRISAT Center, Hyderabad) and long (Hissar, North India) growth duration. The cultivaral differences in plasticity can be screened by growing the cultivars in replications, at two populations, one recommended for that region and the other much lower. For example, we have used low population densities of 8 and 4 plants/m^2 at ICRISAT Center and at Hissar, respectively, for comparison with the recommended population of 33 plants/m^2. The ratio of yields at the two densities will give a measure of plasticity. In highly plastic cultivars, this ratio tends to reach unity. This field technique, for screening for plasticity, is simple and easy.

- N.P. Saxena (ICRISAT).

Pathology

International Chickpea Disease Nurseries

The International Chickpea Root Rots/Wilt Nursery (ICRRWN) - 1979-80 has been sent to 31 locations in 19 countries. The Nursery consists of 56 entries that have been contributed by ICRISAT and Punjab Agricultural University, Gurdaspur Station, India.

The Chickpea International Ascochyta Blight Nursery (CIABN) is now being composed jointly by ICARDA (Syria) and ICRISAT. For 1979-80 the nursery has been sent from ICARDA to 26 locations in 16 countries.

Cooperators are requested to contribute 2 kg seed of the entries which they have