CULTIVATION PRACTICES
OF PEA
CHAPTER - 4

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4.1 CLIMATE:

The pea crop grows best in areas having cool-growing season of at least five months' duration. These conditions are met within the plains of Punjab, Western Uttar Pradesh, parts of Rajasthan, Delhi and in the hills of Kashmir, Punjab, Himachal Pradesh, Uttar Pradesh and West Bengal. In other pea growing areas, as the states of Madhya Pradesh, Maharashtra, Karnataka, Andra Pradesh, Eastern Uttar Pradesh and West Bengal, the growing season is comparatively short and the winter mild. As such, just as in the case of other winter crops like wheat, the yields of peas in these two zones are significantly different, being higher in the northern parts. Although pea is not susceptible to cold, yet severe frost injures considerably the freshly opened flowers and the young developing pods.

4.2 SOIL:

Peas can be grown on a variety of soils - light sandy to heavy clays. Light soils should preferably be used for growing early crops for vegetable purposes but for the harvest of dry peas for which main season varieties are grown, heavier types of soils such as silt loams and dry loams are preferred. Thus best crops are grown on deep loamy soils of the Indo-Gangetic alluvial
region. Heavy clay soils are not used. Soils able to retain sufficient moisture to carry the crop to the stage of maturity with the minimum number of irrigations are ideal because frequent irrigations often tend to increase vegetative growth at the expense of pod formation. The plant thrives also under alkaline conditions but does not do well if the pH falls below 5.5. The most favourable range of pH is between 6.0 and 7.5 and when it is below 6.0, the land should receive a dressing of lime.

4.3 MANURING:

Peas have generally a low nitrogen requirement but in other respects, the fertilizer requirements are normal. It has been observed that except in soils of very low fertility, peas in general do not benefit from an application of farm-yard manure. The manuring of peas would depend mainly on fertility and type of soil. On rich or moderately fertile soils, neither organic manure nor nitrogen from inorganic sources is necessary. A balance between potash and nitrogen is important and potash deficiency must be made good. The Indian soils are, however, reported to have generally satisfactory potash content, but potash may be lacking in light sandy soils. It has been the experience in U.K. that even in potash deficient soils, it is the application of a complete fertilizer which gives the best response rather than the application of potash alone. Similarly, if the phosphate
content is low, the application of phosphate also gives better results in a compound fertilizer. When nitrogen is also considered necessary, the compound fertilizer should contain 3-5 percent nitrogen.

In India, peas for the harvest of green pods are grown more commonly near cities and towns and the white or grey smooth peas are grown for dry peas wherever it is possible to fit in the crop in the cropping pattern. The vegetable growers usually grow this crop either in the field cleared of summer vegetables or in some cases of maize, sorghum or pearl millet (bajra). The white, smooth peas and to some extent the grey-seeded peas are commonly grown as a pure crop in parts of Western Uttar Pradesh, under irrigation. Under these conditions, there is hardly any existing practice of applying organic or inorganic manures to the pea crop.

4.4 APPLICATION OF FERTILIZER:

There are usually two methods of applying fertilizer ie, by broadcasting and by placement at a particular depth in a particular direction. Fertilizers are often broadcast before sowing of seeds. In this practice better results are obtained when fertilizer is broadcast in the early stages of field preparation so that it is thoroughly mixed as deeply as possible in the soil during the subsequent cultivations. Various experiments have shown usefulness of placement of fertilizer in giving
increased yields as compared to broadcasting. This makes the fertilizer more easily available to the plant roots. In this method of application the manure is placed or drilled about 5 cm. to one side and 2.5 cm deeper than the seed. Another practice which is rather unreliable is that of combined drilling of seeds and manure. Especially under drier conditions, fertilizers particularly potash applied in contact with the seeds may severely affect their germination. The placement method is undoubtedly the really satisfactory method of applying fertilizer to the pea crop.

4.5 PREPARATION OF LAND:

Although peas do not grow well on poorly prepared soils, a very fine tilth is not quite necessary. What is required is a reasonably crumbly deeply worked soil.

There should be moisture in the bed at the time of sowing to facilitate germination. Application of irrigation at this stage adversely affects the germination and subsequent growth. However, in case of deficiency of moisture, it is preferable to irrigate the field before sowing. This may not be required in the case of rice lands if timely preparation of land is taken up. In the case of garden peas, some of the farmers prefer to grow the crop by using bed and furrow method. In such a case sowing can be done even in moisture-deficient soil for the required moisture can be made available by furrow irrigation, after sowing.
4.6 SOWING AND SEED-RATE:

Sowing is done by two methods.

4.6.1 Hand dibbling:

This is followed in the case of early sowing of smooth, green seeded peas. It consists in dibbling the seeds by hand on the edges of the furrows on both the sides of the bed which is usually 60 cm. wide. This width gives sufficient space for the spread of two rows of plants of early dwarf varieties.

4.6.2 Drilling:

In the case of garden peas, the main sowing is usually done by dropping the seeds in the furrows opened by a 'desi' plough and the furrows are covered by the usual planking. Some farmers drill the seed through the 'pora' attached to the plough; the furrows in this case are not covered.

The depth of sowing the seed varies from 5 to 7.5 cm. according to soil moisture. Although wet seed bed is to be avoided, peas need adequate moisture; in dry seedbeds germination is delayed and is irregular, sowing of overnight soaked seeds improves germination. Inoculation of pea seeds with pea nodule bacterium culture is recommended when peas are planted for the first time and also when the crop is to be grown on a poor soil. The culture material is emulsified in a small quantity of 10 per cent sugar or 'gur' solution sufficient to moisten the
seed. The seed is then heaped on a clean floor and moistened and mixed thoroughly with the solution. The moistened seed is then spread in a thin layer in shade to dry and sown in the field in the evening or a cloudy day. In the dibbling method which is practised in the case of rather costly seeds of early varieties, about 125 kg. are required to sow one hectare. In the case of main season vegetable varieties which are usually wrinkled and bold-seeded, when sown in the furrows about 37.5 cm. apart, a seed-rate of 50-62.25 kg. is used. In the case of smooth, white-seeded varieties, grown for the harvest of dry peas, about 75 kg. per hectare is the usual seed-rate.

4.7 TIME OF SOWING:

The sowing of garden peas commences during the first fortnight of October and continues till November in the plains of Northern India. If weather permits, some growers make first sowing of hardy round-seeded varieties during the second fortnight of September. On the other side a late sowing is made up to about the middle of December. In the hills of Northern India, the spring sowing commences in February and another sowing is made for autumn harvest during the rainy season. For the over-wintering crop, sowing is made during October-November.

In some parts of peninsular India, besides the main sowing, an additional sowing is made during June-July. In
the southern states, peas are cultivated mainly in the
hills where as in north India, three sowings are made
during March-April, August-September and November-December.

For field peas, there is normally one main sowing
and the sowing period extends from mid-October to end of
November.

4.8 SPACING:

The spacing to be followed varies with the variety,
the taller being given wider spacing; the early crop is
sown more thickly to allow for losses caused by rather
unfavourable conditions. In India, hardly any tall-growing
garden pea varieties are commercially cultivated. The
early sown dwarf varieties are spaced about 22.5 cm. to 30
cm. between rows and 3.75 cm. to 5 cm. between plants. The
self-stalking medium tall varieties with the usual furrow
sowing method are given a row spacing of about 30 to 37.5
cm. under non-irrigated conditions and from 45 to 60 cm.
under irrigated conditions.

4.9 IRRIGATION:

In the case of garden peas, if furrows and bed
system is used, watering will have to be done more
frequently than in case of flat bed system. In the former
case, irrigation may have to be given soon after sowing
for germination and subsequently irrigation would be
required every fortnight or so depending upon the type of
soil. The common practice, however is to sow in flat beds
in optimum moisture and irrigate the crop only at the commencement of flowering. Some farmers however, do not irrigate the crop so that surface does not form a crust and proper aeration is possible.

In the case of field peas, it is mainly tall varieties which are grown for pure crop of peas. These are sown either in paddy lands after harvest of paddy or in lands which get inundated during the rainy season but which become available after water recedes. Such crops are usually not irrigated. The crop grown in canal irrigated lands, especially in western Uttar Pradesh, is given 2-3 irrigations during the growing season. The small grey or white-seeded field peas are usually sown as companion crop with wheat, especially in parts of Bihar and Madhya Pradesh in the 'barani' (rainfed) lands.

4.10 HARVESTING:

The green pods for the market are hand picked. Therefore, it is necessary that adequate labour should be available in commercial pea-growing areas. Most commercial pea growers in Punjab, Delhi and Uttar Pradesh dispose off the standing crops to the contractors who engage their own pickers. Usually female pickers are employed who pick about 37 kg. per head per day. In India, the usual practice is to make periodical pickings from the same crop although in some of the European countries harvesting is also done by pulling out the plant and then stripping the
marketable pods. In the former method it is possible to harvest well graded pods. For purpose of canning and dehydration which are more commonly done in some other countries, the harvesting is usually done by a pea viner. In India, however, it is the hand-picked pods which are supplied to the small factories handling peas for canning and dehydration. Green peas are usually packed in gunny bags and the use of crates and special baskets is not in vogue. Ordinary baskets of bamboo or sticks of 'arhar' and mulberry are also used in some of the areas. The usual experience is that for transporting peas to distant markets, especially during the summer months, baskets are more suitable than gunny bags.

4.11 YIELD:

The yield of green pods varies with the variety, climatic condition, soil, manuring and irrigation. However, individual plots in the case of early varieties would yield 27.75 to 37 quintals and main season varieties 74 to 92.5 quintals per hectare. The main season wrinkled-seeded garden pea varieties may yield from 23.12 to 27.75 quintals per hectare for dry peas. Amongst the smooth-seeded field peas, varieties such as T-163 are expected to yield about 27.75 quintals of dry peas per hectare where as the dwarf grey-seeded varieties may yield only 462.8 kg to 647 kg. per hectare.
4.12 USES:

Peas are consumed both in the fresh form as vegetable and in the dried form as a pulse.

The shelled green peas are also utilized for preparation of canned peas, frozen peas and dehydrated peas.

The tall-growing peas chiefly of the round, white or grey-seeded types, are grown as a companion crop with oats for green fodder. Field peas are grown along with oats for making silage or hay and also for pasturage. The pea vine is also used for making silage which contains on an average 7.1% digestible protein and 57.8% total digestible nutrients on dry matter basis.

The active principle of pea oil, \( \text{m-xylohydroquinone} \) diminishes spermatogenesis in males. It has no toxic effects and has no abortifacient action whatsoever. It's use as an oral contraceptive was indicated.

A potent hyperglycaemic extract from the testa of pea seeds; an extract from the whole pea when fed to rabbit was effective in lowering the blood-sugar level and in reducing alimentary hyperglycaemia.

4.13 PROCESSING:

Green peas are processed in various ways; these may be sun-dried, mechanically dehydrated, canned or frozen. Sun-drying is reported to be done on a small scale in Uttar Pradesh. This product is generally sold to the
canners. Dehydration of green peas has also been undertaken in India on a small scale in Uttar Pradesh. Canning is also mostly done in Uttar Pradesh, which is the biggest producer of green peas in India. Canned peas are mostly used by the army and are also gaining popularity with the civilians.

In foreign countries, canning of green peas has been developed to a considerable extent and it is almost a fully automatic process from the field to the final packing. In India, however, the picking of green pods is done by hands. In the factory also the pods are shelled manually. A few factories have set up pea hullers for shelling the pods. The shelled peas are blanched (by putting in hot water for a short time) to inactivate enzymes and reduce microbes. The blanched peas are filled into cans and covered with hot brine solution with 2.5% salt and 2-4% sugar, depending upon the stage of maturity of peas. If green peas are to be canned as curried peas the usual spices in the form of curry and hydrogenated oil are mixed and added with suitable amount of brine to cover the inter-spaces in the cans.

The pods of some varieties called edible podded or sugar-podded, are chopped like those of French bean or the garden 'lablab' so that the entire pod is utilized. The edible-podded peas are hardly known in India; but in view of their nutritive value these deserve to be grown on a commercial basis in India.
The round smooth-seeded field peas of various colours are used as pulse mostly in the split form. Dry peas are also used for making 'besan' (flour) as a substitute for gram 'besan'. In northern India, the smooth white dry peas are also used like gram for the savoury dish, popularly known as 'chat'.

4.14 DISEASES AND CONTROLS:

Several diseases of pea plants caused by fungus and pests are reported.

4.14.1 Fungus diseases and control:

Amongst the diseases of peas in India, the more important are fusarium foot rot (Fusarium orthoceras Var. pisi), which is distinct from wilt disease (Fusarium oxysporum f. pisi) and affects the stem below the surface of the soil. The fungus persists in the infected vines and the soil. The wilt disease causes considerable damage when the crop is sown early and on light soils. The fungus lives in the soil and it may also be carried by the seed. The only effective way to prevent the disease is to grow wilt resistant varieties, such as 'Delwiche commando', 'Bonneville', 'Early perfection' etc.

The powdery mildew (Erysiphe polygoni) usually appears at the late stage of crop when the temperature starts increasing. Dusting the crop with fine sulphur dust at the rate of 16.9 kg per hectare is cheap and effective method of controlling the disease.
Rust (Uromyces fobae) is common in Indo-Gangetic plains. The pustules appear on the leaves, stem and pods during February-March. The disease develops quickly under high humidity and moderate temperature. Crop rotation, destruction of diseased plant debris and treatment of seeds with organomercurials have been recommended for the control of this disease.

4.14.2 Pests and controls:

The leaf-eating caterpillar (Lapphygma exigua H.) feeds on the leaves, generally during morning and evening and in serious cases of attack defoliates the plants. Dusting the crop with 5 per cent BHC at 15-20 kg. per hectare controls the pests.

The larvae of the pod borer (Heliothis obselata P.), eat away the leaves and bore into the pods eating up the seeds. It can be controlled by spraying endosulfan (0.07%) once or twice at the fruiting stage.

The pea aphids (Microsiphum pism K.) suck the cell sap which results in yellowing and subsequent drying of leaves. It can be controlled by,

i) Periodical spraying with 40 per cent nicotine sulphate (1 part in 800 parts of water) and 1.35 to 1.80 kg. of soap per 416 litres of spray at an interval of 10-15 days.

ii) Spray with tobacco decoction.
The pea thrips (*Thrips indicus* H.) cause damage to flowers and pods. The control measures are the same as those of pea aphids.

The larvae of the leaf miner (*Phytomyza articopnis*), mine the leaves and make silvery lines on them. These can be controlled by spraying the crop with 0.05 per cent nicotine sulphate (40 per cent).

Besides the above pests, there are also pests of the stored grains, viz. the bruchids. The eggs are laid on the surface of the seed and the newly hatched grubs bore through the seeds in which a circular hole appears near the surface of the grain, leaving only a thin outer membrane as covering. It pupates inside the grain. For use as seed, the seeds may be chemically treated with insecticidal dusts, such as Disulfotone. For storing grains for human consumption, fumigation with methylebromide is usually recommended.

4.15 SOME PROMISING VARIETIES:

Several good varieties of garden peas as well as field peas are already in cultivation in India. Important varieties are early smooth-seeded Asauji, Lucknow Boniya, Alaska, Early Superb, Early Badger, Yates Early Crop, Little Marvel, Kelvedon Wonder, Early December, Kanawari, Bonneville, T.19, Lincoln or Green feast, Delwiche Commando, Khapar Kheda, N.P.29, Duke of Albony, T.163, Mahandorfer (Early Yellow Victoria), Victoria, B.R.118,