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Bellary Onions.

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Onions in this Presidency are extensively cultivated and exist in various kinds. Bulbs with shades of colour varying from pure silvery-white to deep crimson and of sizes ranging from the small Gollaprolu variety growing in cluster to the big single-bulb type of the Bellary District are all met with. The Ceded Districts abound in the single-bulb variety and the typical Bellary onion is red in colour with a mild agreeable flavour and a sweet taste and entirely devoid of the pungency of the small-bulb varieties. Even in the Bellary district, the crops in the western taluks are a mixture of the white and the red variety and as the Mysore frontier is reached, the white is found to replace the red completely. The white is locally supposed to have medicinal properties while the red is the best for the culinary and highly valued in the market.

Onions in various parts of the Presidency are commonly grown in several seasons during the year. For instance, there are three seasons to raise this crop in the Pollachi taluk. The Bellary onion has two well-marked seasons for its growth (1 the Monsoon crop from July to December and (2) the hot weather crop from the middle of October to the middle of May. These periods include the duration of the nursery as well for the respective crops. Of the two, the hot-weather crop is the highly valued for several reasons. It commands higher prices in the market and gets a ready export to Madras from the demand prevailing there. Its bulbs keep long and do not have as much dryage on keeping as in the case of the Monsoon crop. Again to raise a crop for seed, bulbs of this summer crop alone require to be planted and not those of the other (vide infra).

Onion, in this locality, is generally grown in a two course rotation with irrigated sorghum or ragi or irrigated Italian millet or fodder Cumbu. The first of the above mentioned viz., the rotation with irrigated sorghum is the one that is commonly obtained.

The onion crop for bulbs is as a rule raised from seedlings in this tract while this system is rarely known or slightly obtains in other parts of this presidency. The seedlings for both the hot-weather and the Monsoon crops are raised from nurseries the seed for which is derived from an altogether different crop (vide infra).

The bulb crops of the Monsoon and the hot-weather raised by transplanting seedlings:—'Fine as an onion bed' is a common English saying. To ensure good germination and a healthy nursery, the land intended for the nursery is well worked with picks and all clods fully crumbled till a fine tilth is obtained. Heavy dressings of cattle manure are applied and incorporated into the soil. Beds of about one-eighth cent in area are then formed. The seed is sown in lines in small groove-like furrows made with the fingers of the hand at intervals of four to six inches. After sowing the seed is covered by gently passing the hand on the soil surface. Water is then let into the beds. Four pounds of seed sown in three to four cents will produce enough seedlings to transplant an acre. To help the thickening of the stalk or stem of the seedling, its top, nearly an inch or two from the tip, may be scissored after a month or forty days' growth. The scissoring may be repeated a second time after another short interval, if necessary. The judgment of the time of lifting may be exercised when the majority of the seedlings have assumed sufficient thickness to allow convenient holding with the fingers for transplantation. July and October are the months when the nurseries for the monsoon and the hot-weather crops are started.

The main field is prepared as any other garden field in the Ceded districts. Round about Waneyanoor, an important centre of onion cultivation, the field is deep ploughed with the Bellary plough, the local iron plough, and a heavy blade harrow (Pedda guntaka) is passed to crush the clods and level the field. Further levelling and tilth are obtained with the ordinary four span *guntaka* which is worked weighted with that of the driver on the beam. In between these later guntaka workings cattle manure, or the same supplemented with village heapings, is applied at 20

to 25 cart loads per acre and the same incorporated into the soil by working a gorru with the hopper and the tubes removed. Sheep penning or the direct application of sheep manure is not resorted to as this is found by experience to have a deleterious effect in retarding the development of the bulb. But indirect application by manuring the previous ragi crop with the same is not held in disfavour and is actually resorted to by several ryots that grow onions in rotation with ragi. There however, being large areas under garden cultivation, the demand for manure is never fully met. Some ryots near Thornagal, another important centre of cultivation, are content with apylying eight cart-loads of cattle manure per acre.

After the land is thus prepared a *bodhi*-guntaka is then drawn to mark out channels with intervening beds. In most places the area within the bed is thrown into ridges and furrows to expose greater surface to and increase the capacity for irrigation water. The beds with the ridges and furrows in them are all rectified with madi-guntakas. Water is then let in and the seedlings are transplanted on the sides of rides. The operations of lifting, carrying and supplying seedlings, of irrigating the land and transplanting take 16 men and 40 women per acre.

An irrigation is given the next day after transplantation and subsequent irrigations and hoeings with hand hoes are alternated at intervals according to necessity.

After the crop established itself sometimes a bacterial disease may appear during heavy rains or under humid weather conditions when a spraying with Bordeaux mixture may usefully avert the malady.

In the monsoon crop, in about two months after transplantation, the above ground vegetative part or the stalks run to rank growth. These may be trampled with the feet at about two to three inches from the ground level to prevent abnormal nutrition to the stalk to the detriment of the bulb. This operation needs of course to be done when the land is dry and not immediately after an irrigation. The stalks again assume an erect position in two or three days after the trampling is done. The trampling

may be resumed without harm a second or third time at intervals of a week. As the ripening stage approaches buds and flowers also appear and these require to be nipped off at once so as to leave all the nutrient to the progressive development of the bulb.

On no account should there be a similar performance either of trampling the stem or of nipping the flower stalk in the case of the hot-weather crop as such practices are attended with diminutive or rotten bulbs. The reason is not far to seek. In the summer notwithstanding proper irrigations, the vegetative part is not so succulent as in winter and when dealt with in the above manner, it is unable to return to normal conditions so as to function physiologically and photosynthetically for bulb development.

The time of harvest may be judged from the colour of the stalk and the size of the bulb. A well developed bulb may be up to three or four inches in diameter. The crop is irrigated two days before harvest. The bulbs may be pulled out with the stalk or dug with hand hoes or other suitable implements according to the condition of the soil. After harvest the shoot and the root may be cut off with a knife or a sickle or அறுவாமனை. Thirty women are required per acre for the harvesting operations above noted. The yields vary from 600 maunds to 1000 maunds per acre. Twenty thousand pounds is a fair yield per acre.

The crop to obtain seed by planting bulbs.—At the time of the harvest of the hot-weather crop, bulbs are carefully selected as material for planting to raise a crop for seed. The roots of bulbs intended for such a purpose are not cut off at the time of harvest as in the case of produce got ready for marketing lest the shoots may be damaged in the operation. These bulbs are next preserved till the time of the sowing season (middle of October) in an invert position, in plaited wicker work, on raised platforms in shade, in the open. This 'Puri', as it is called, is opened only at the time of planting lest the bulbs may shoot forth on exposure to air in humid weather. The arrangement of the bulbs in an invert position for preservation is also to prevent them from sending forth shoots during the period.

Bulbs of the monsoon crop are not used for planting to raise a crop for seed. These bulbs also shoot forth, flower and produce seed. But when a nursery is raised with this seed and the seedlings transplanted, these latter in the main field produce lean elongated bulbs inferior in quality and taste and not the big, round and wholesome bulbs. Here is thus another instance to add to that long list of crops that grow best with the material obtained under the driest conditions.

For planting the bulbs to raise crop for seed, the field is prepared in the same manner as in the case of the monsoon and the hot-weather crops for bulbs. Instead of beds, the whole field is thrown into regular ridges and channels, preferably across a slope if the field has one, the distance obtained between the centres of two consecutive ridges being one and a half feet. The bulbs are next planted only on one side of the ridge at intervals of a foot in the row. The soil is loosened with hand hoes and a bulb is put in each spot so chosen and then covered. The ryots at Waneyanur cut the bulb into two horizontally before planting. The bottom portion containing the shoot is planted while the top is utilised for cooking. An acre reqnires two thousand pounds of bulbs for planting.

After planting, the crop needs only timely irrigations and hoeings. During flowering time the umbels are sometimes subjected to a severe attack of thrips. In former years spraying with paraffin emulsion was used with success at the Hagari Experimental station to remedy the evil. The proportions for use are as follows:—

Soap	...	16 lb.
Paraffin oil	...	4 gallons.
Water	....	60 „

The soap is cut and boiled in two gallons of water. The oil is then added and the whole stirred for fifteen minutes. The rest of the water is finally added to the mixture. For use, this emulsion is diluted with nine times its volume of water. The emulsion is always prepared for immediate needs and is not stocked as it would not keep.

Bordeaux mixture, now commonly used equally answers the purpose.

From February onwards the umbels get ripe with black seed and are ready for picking. Sometimes a second flush is induced with rains in February—March when the pickings may prolong till the end of April. The picked umbels are heaped for a day and then dried in the sun on the two succeeding days. The seed is obtained by beating the umbels with stricks. Besides the seed some bulbs are obtained from the same crop. These are neither wholesome nor of any preserving quality ; they fetch only a poor price. A crop which I planted for seed at the Hagari Experimental Station on 14-10-1928 on an area of 0·85 acres in the fild No. G. 14 gave on harvest at the rate of 194 pounds of seed and 2,964 pounds of bulbs per acre. The crop gave a phenomenal return of Rs. 645 net per acre.

Bellary Onion Seed :—Onion seeds in India will not keep for more than a year and renewal from proper sources is quite necessary to raise fresh crops year after year. Seed from a dry tract like Bellary is sure to acquit itself in very many soils and climes. The regular indents received at the Hagari Experimental station every season and without exception from the Superintendents of all the Jails in the Presidency, from private parties in the Nilgiris and the Nizams' Dominions, from Prome in Burma aad Karachi in Sind is itself a conclusive proof that the Bellary onion seed is able to hold its own in different soils of far distant places and possessing great variations in climate.

A word of caution regarding the seed is here necessary Tempted by the high price of onion seed ruling in the market, certain ryots raise a seed crop, plant the bulbs of the monsoon instead of the hotweather crop, either on account of the cheap rate at which the bulbs of the monsoon crop are obtained or from their inability to procure the preserved bulbs of the hotweather crop. Again sometimes under unfavourable seasonal conditions, certain plants in the Monsoon crop for bulbs do not develop good bulbs and then are left in the field even after the remaining are harvested. As this period synchronises with the time

of maturing of the seed crop, these above referred plants also flower and seed. As all such seed is passed off as genuine seed, buyers should take care in obtaining their supply from honest and reliable sources.

Lastly, it may here be considered whether it is economical and worth the pains to grow crops for bulbs from seed instead of from bulbs. Propagation by seed is always conducive to healthier and more vital products than vegetative propagation. It is certainly economical and to great advantage if the primitive method of growing bulb from bulb is abandoned and the raising of crops by the transplantation of seedlings is resorted to instead. As the prices of seed and of bulbs are ever fluctuating in the market, it is not possible to give exactly the excess amount needed to purchase bulbs, when these are used as the propagating material, over the cost of the nursery required for the same area when transplantatian is adopted. This difference within ordinary limits will clearly be about Rs. 10 to Rs. 15 per acre. Even when there is no difference, the advantages are all on the side of the transplanted crop. As in most crops and so with the onion, the size and quality of the produce are improved by transplantation: and the degree of disease resistance from insects, fungi and bacteria is much the greater when such a system is adopted.