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Tips on

**A9**

**BETTER**

**FARMING**

1392

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*THIS is a compilation of selected Farm Releases issued by the Farm Information Unit, Directorate of Extension, Ministry of Food and Agriculture, to the rural press during 1957 and 1958. These Releases provide tips on better farming practices, based on research results, but are in no way complete in the information furnished. Further information on these should be obtained from local agricultural officers.*

**Edited by M.G. Kamath**



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*Tips on*  
**BETTER  
FARMING**



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CROPS

BARLEY

ADUTHURAI

### IMPROVED BARLEY VARIETIES

FARMERS who are raising a barley crop in the rabi season are advised to obtain the seed of an improved variety suitable for their areas. An improved variety yields better than the local seed.

The Agricultural Department of the state concerned or the Gram Sevak will be able to advise on what variety is most suited for the locality, and also arrange for its supply to the farmers.

Among the varieties recommended are C50, C84, K12, C12, C25 and C292 of Uttar Pradesh, T4, T5 and 138-2 of the Punjab and N.P.13 evolved by the Indian Agricultural Research Institute, New Delhi.

### CARDAMOM

#### RAISING CARDAMOM SEEDLINGS

To get the maximum germination of cardamom seed, it has to be sown immediately after harvesting.

This has been proved in experiments conducted in the Singampatti Hills.

When freshly-harvested seed was sown in nursery beds, the highest germination of 75 per cent was obtained.

The germination capacity decreased with the delay in sowing the seed. Ninety-four per cent of the seed sown about  $3\frac{1}{2}$  months after harvesting failed to germinate.

Raising a sufficient number of cardamom seedlings is one of the most difficult jobs the cardamom planter faces.

### COCONUT

#### KEEPING COCONUT PALMS HEALTHY

Spraying the coconut palms thrice a year is being recommended for timely checking of the spread of pests and diseases of the palm.



Such a spraying schedule cures the leaf disease in its early stages, and helps the diseased tree regain its normal bearing.

For spraying, a mixture of a copper fungicide (like Bordeaux mixture) and DDT is recommended. The spray should reach the undersurface of the leaves.

The cost of spraying can be very much reduced if the operation is combined with harvesting.

Spraying, however, should be avoided during the monsoons. The best time would be September-October, January-February and April-May.

### UNDERPLANTING IN COCONUT GARDENS

Underplanting in a coconut garden, if properly done, pays well.

Underplanting, or the planting of new seedlings in a garden a few years before the uneconomic trees are actually cut, is being commonly practised in most coconut gardens.

When underplanting, the new seedlings should be planted ten to 12 feet away from the old trees.

Underplanting should not be done when the trees in a garden are only 30 to 40 years old, as they still will have some more economic life. This, of course, does not apply when the trees had been surface-planted. Such trees have a shorter economic life than deep-planted ones.

All newly-planted seedlings should be properly manured, so that they may get a good start in life.

Deep digging or ploughing the soil around the newly-planted seedlings is necessary to remove the matted roots of the old trees.

### HARVESTING COCONUTS

If you are harvesting coconuts for copra-making, harvest them only when they are fully mature. Coconuts are mature at 12 months.

But if green husks fetch a premium price in your area for retting purposes, harvest the nuts a month earlier.

Experiments show that by harvesting nuts a month prior to their full maturity, the copra yield will be less by six per cent; with ten-month old nuts, the loss is 16 per cent and with nine-month old ones, 33 per cent. The loss in oil will also be to a similar extent. Moreover, copra from a 12-month old nut will be crisp and white.



Experiments also show that fibre from husks of 12-month old nuts is of inferior quality, being brittle and of a brownish colour. Fibre from 11-month and ten-month old husks is good, being elastic and of a golden yellow colour. On the other hand, fibre from a nine-month old husk is inferior.

## COTTON

### A NEW VARIETY IN KATHIAWAR

A new variety of cotton is being multiplied and distributed to cotton-growers in the Mathio tract in southern Kathiawar and parts of Ahmedabad district in Bombay State.

The new variety, C.J.73, developed by the Indian Central Cotton Committee, has been found to be suitable for spinning about 40's H.S.C. It has a ginning outturn of 34 per cent, and a staple of 7/8 inch to 15/16 inch. C.J.73 gives an average yield of about 440 pounds per acre, and brings in a cash return of Rs.258 per acre as against Rs.200 from *Pratap*, the popular improved strain in the area, and Rs.196 from the local Mathio cotton.

C.J.73 has now been tested for over five years, and has been found to have better qualities than *Pratap*. It is highly suitable to the soil and climatic conditions of southern Kathiawar. The tract has an irregular and uneven rainfall and long spells of drought, and is subject to frost.

### DIGVIJAY COTTON

*Digvijay* is the name of a new variety of cotton recently introduced into the Middle Gujarat cotton area.

Till now, *Vijay* has been the improved strain for this area. The new variety yields 20 pounds more of *kapas* per acre than *Vijay* and gins almost the same, but possesses superior fibre capable of spinning two to three counts better than *Vijay*. In terms of cash returns per acre, the farmer gains Rs.10 to 12 more, on an average, than on *Vijay*.

*Digvijay* was derived from a cross between *Vijay* and 1027 A.L.F. If *Digvijay* spreads over the entire tract of Middle Gujarat, the farmers will benefit to the tune of nearly nine crores of rupees per annum.

### SHORT AND COARSE COTTONS

The world's shortest and coarsest cotton, the *Comilla* of India, has a good demand in foreign countries. So has the other harsh short staple cotton, *Bengal desi*.



Because of their extreme harshness of staple and the springy and resilient nature of the fibre, they can be mixed well with wool in the manufacture of blankets and other woollen goods; hence, they are in demand in other countries, especially the U.S.A. and Japan, and earn valuable foreign exchange for India.

These cottons earn comparatively high prices in foreign markets; and hence attempts are being made to increase their acreage as well as production.

At present, the total annual production of *Bengal desi* and *Comilla* in India averages about 3.37 lakh bales, of which about 1.05 lakh bales are exported.

While *Comilla* is produced in the hills of Assam, *Bengal desi* is produced in the Punjab, Rajasthan and Uttar Pradesh.

The Indian Central Cotton Committee is now encouraging growing of these cottons in exclusive areas where there is no risk of their being used for admixture with long staple cottons. They estimate that the acreage under these cottons can be taken up to three lakh acres and the production raised by 1½ lakh bales.

The prospective states which can take up production of these cottons are Rajasthan, Madras, Mysore, Andhra Pradesh, Uttar Pradesh, Madhya Pradesh and Assam. It is expected that the good demand for these cottons and the high prices they fetch will encourage more growers to take up their cultivation.

### NEW COTTON FOR MADRAS

Cotton farmers in Madras State are earning an extra gross profit of nearly Rs. 56 per acre by growing the new long staple cotton Madras Uganda Number 2, or MCU-2 for short.

MCU-2 has been found to be suitable for growing in the 60,000-acre summer-cropped area in the Madurai, Ramanathapuram and Tirunelveli Districts of the State.

The new cotton is best suited for growing in the summer season from March to mid-August in these Districts.

It has a staple length of 1.1/32 to 1.1/16 inches, and is suitable for spinning 36 to 38's counts with a count strength product of 1797 at 30's and 1591 at 40's and a Pressley Strength index of 7.03. It is considered to be one of the best quality cottons grown in this country on a commercial scale.

MCU-2 yields about three-fourths of a bale of lint per acre, and gins 34 per cent. Besides, it matures within the short space of five to 5½



months, and so is ideal for growing in the summer-cropped area where paddy is sown in rotation with cotton.

### BETTER COTTON YIELDS

Early sowings of cotton result in increased yields.

This has been shown in experiments conducted at the research stations at Abohar, Hansi and Jullundur, representing the three cotton-growing tracts of the Punjab.

The experiments showed that May for Abohar, mid-April to mid-May for Hansi and mid-April to the first week of May for Jullundur were the optimum sowing periods for the crop.

Early sowings resulted in a greater growth and fruiting of the cotton plants. It was also possible to give one or two intercultivations (dry cultivations) to the crop before the monsoon set in. This helped in keeping the weeds down.

It was also seen that late sowings were prone to a greater attack of the leaf roller and jassids.

### MANURING GAORANI COTTON

Experiments conducted at the Cotton Research Station, Nanded (Bombay State), show that it pays to apply fertilizers to *Gaorani* cotton grown in the Marathawada area of Bombay State.

The following recommendations are being made.

Where a farmer cannot afford to give both nitrogenous fertilizers and phosphate, he should give 20 pounds of nitrogen per acre to cotton to get higher yields.

Farmers who can afford to give both nitrogen and phosphate should include a leguminous crop (like groundnut or gram) in the cotton rotation, and give 30 pounds of phosphoric acid per acre to the legume and 30 pounds of nitrogen per acre to the cotton crop after the legume.

The second practice will not only provide the farmer with a better rotation, but will also give him higher yields of both the legume and cotton.

### NEW COTTON VARIETY FOR UTTAR PRADESH

A new improved cotton variety is being recommended for growing in Uttar Pradesh.



Named 35/1, the new variety has been found to give an extra income of Rs. 34 per acre over C. 520, the variety earlier introduced into the State.

On farmers' fields, 35/1 has given better yields than any other strain - an average of 714 pounds of *kapas* and 264 pounds of lint per acre. Its staple length in the 32nd inch is 26, ginning percentage 37 and spinning performance in mill tests 16.

In 1956-57, 35/1 covered an area of 64,000 acres in the State. The additional income obtained by cotton growers by planting this variety has been estimated at nearly 10½ lakhs of rupees.

The Indian Central Cotton Committee is at present financing a scheme for the distribution of seed and extension of this improved cotton variety, and expects to cover an area of 1½ lakhs of acres in the Districts of Meerut, Muzaffarnagar, Bijnor, Saharanpur and Moradabad.

### ROTATION AFFECTS COTTON YIELDS

A cotton crop grown after a fallow is found to give the best yield, followed by cotton after *guara*, berseem or gram, in experiments in the Punjab. Cotton after wheat gave the lowest yield.

The cotton crop in the rotation wheat-fallow-fallow-cotton gave 16.5 maunds of cotton per acre, and wheat-*guara*-fallow-cotton 16.4 maunds. Cotton in wheat-fallow-berseem-cotton gave 15.8 maunds of cotton, while in wheat-fallow-gram-cotton it gave 14.5 maunds.

In the wheat-fallow-wheat-cotton rotation, the yield of cotton was 12.7 maunds.

### YIELD AND FIBRE QUALITY OF COTTON

District trials with the Indo-American strains of cotton in the Gujarat area of Bombay State show that high yield and superior fibre quality depend upon a well-distributed rainfall.

It was also seen that the Indo-American cotton strains being shallow-rooted, drainage conditions of the soil have much to do with their yield and fibre quality.

The strains were found to do better in the *goradu* (or light and well-drained) soils than the black soils under rain-fed conditions, but for a high yield and assured quality, supplementary irrigations were found necessary.

The strains under trial were 170-Co2(Deviraj), 134-Co2-M(Devitej)



and 68 x 22 popularly grown in Gujarat.

## NEW PUNJAB COTTONS

As a result of intensive research work conducted in the Punjab, two new strains of long staple cotton have recently been evolved.

The two new strains are LL.53 and LL.54. LL.53 has a mean fibre length of 1.10 inches and LL.54 1.07 inches. These strains also have other desirable economic characters like greater yield and higher ginning percentage. Trials have shown that the two strains are better than 320 F cotton which is the popular strain in the State at present.

District trials with the new strains have given very encouraging results, bringing an average cash return of Rs.625 in the case of LL.53 and Rs.686 in the case of LL.54 per acre, as against Rs.608 from 320 F.

Extensive trials with the two strains are now being planned all over the State.

## GINGER

### MULCHING GINGER

Farmers usually leave a portion of their ginger crop unharvested. This is harvested later and used as seed for the next crop.

Experiments in Madras State show that if a thick mulch of green leaves is provided for such a portion of the crop, the yield of ginger rhizomes increases.

In experiments, an area mulched with green leaves at 5,000 pounds per acre gave 10,700 pounds of rhizomes per acre, while a similar area not mulched gave only 9,500 pounds of rhizomes per acre.

## GROUNDNUT

### USE OF SEED-DRILL

Sowing groundnuts with a mechanical seed-drill drawn by a pair of bullocks saves on production costs.

The seed-drill covers a comparatively large area of three to four acres a day.

Line-sowing with the seed-drill makes further operations with implements easy.



The seed-drill can regulate the seed-rate, as the distance between rows and plants in the row can be adjusted. The drill is also suitable for sowing any type of groundnut.

If a heavy iron rod or a chain is attached to the seed-drill, the sowing and covering operations can be combined into one.

A similar mechanical sowing unit is also now available for working with a tractor. With this device, 15 acres can be sown in a day.

### TIPS ON GROUNDNUT CULTIVATION

Experiments conducted on fertilizing groundnut show that good yields can be had if farmers adopt the following measures:

- ✓ (1) the crop should not be grown on the same land year after year;
- ✓ (2) a mixture of cattle manure and ash should be applied at ten cart-loads (five tons) per acre, or  
alternatively, one hundredweight of superphosphate and one hundredweight of potassium sulphate can be applied over a basal dressing of available cattle manure;
- ✓ (3) a topdressing with two to four hundredweights of lime per acre should be given to soils deficient in lime, like the laterite soils of the West Coast, at the time of the first intercultivation.

### SUFFICIENT INTERCULTURE ESSENTIAL

In many places where groundnut has been newly introduced, farmers give a single intercultivation to the crop.

This is insufficient. At least two intercultivations should be given to the crop to get good results.

Though the nature and frequency of intercultivation given to the groundnut crop depend on the condition of soil and the amount of rainfall received in a particular area, normally, two hoeings and weedings should be given.

The first intercultivation is given three weeks after sowing, and the other a month later.

The first one helps to remove weeds and enables the soil to store more moisture. The second intercultivation makes the soil loose and helps the 'pegs' (stalks of pods) to get into the soil easily.

Where the rainfall is low and ill-distributed, frequent intercultivation has been found to greatly help the soil to conserve moisture.



In the case of the bunch type of groundnut, earthing up of plants at the time of the final intercultivation is found to increase the formation of pods.

## SPACING IN GROUNDNUT

Spacing trials with groundnut in Bihar have shown that the crop gives best results when spaced six inches between plants and a foot between rows.

In the State, farmers sow groundnut in rows two feet apart with a distance of nearly one foot between plants. The variety cultivated is the spreading one. Farmers also practise ridging when the plants have grown six to nine inches high. But the trials show that ridging had no special advantage from the yield point of view.

## JOWAR

### RESPONDS TO MANURING

*Jowar* grown for fodder responds very well to manuring.

It has been found that a dose of 50 pounds of nitrogen (250 pounds of ammonium sulphate) per acre increases the fodder yield by a 100 to 150 maunds, provided the soil has a good store of moisture.

Under unirrigated conditions, 100 pounds of ammonium sulphate per acre is recommended for application, especially when the farmer is unable to apply sufficient quantity of cattle manure to the crop. The fertilizer is best applied at sowing time.

### RATOONING JOWAR

Following the release of short-duration *jowar* (*cbolam*) strains, farmers in Coimbatore District of Madras State have been able to raise a ratoon crop of *jowar* with profit.

Co. 12, one of the new strains released, has a duration of 85 days, and Co. 18, another one, of 90 days.

In the District, irrigated *vellai cbolam* is usually sown by the middle of March and harvested in June. The succeeding crop is sown during August-September.

To raise a ratoon crop, the sowing date is advanced to the third week of February and the crop harvested by about the third week of May. Six



inches of stubble is left on the field, and the field given an irrigation.

The stalks of the ratoon crop are thin, and the plants a little shorter than those of the original crop. The ratoon crop matures in 70 to 75 days and is harvested by about the last week of July.

The economic practice of raising a *jowar* ratoon is being followed by farmers who are able to plough and prepare the land for planting the cotton crop during the first half of August.

## JUTE

### IMPROVED CULTURAL PRACTICES

Improved cultural practices result not only in a higher yield, but also in lowering the cost of cultivation of jute. This has been amply proved by 139 trials conducted on farmers' fields in West Bengal last year.

The average cost of cultivation per acre by following the improved practices worked out to about Rs.220 as against Rs.262 when the local practices were followed.

The improved practices taken up were using seeds of improved varieties, sowing in lines by seed-drill, interculturing by wheel-hoes, judicious application of manures and fertilizers and adoption of plant protection measures to control diseases and pests.

The average yield per acre under the improved methods came to nearly 19 maunds of fibre as against about  $15\frac{1}{2}$  by the traditional practices.

### FERTILIZING JUTE

Trials conducted at the Jute Agricultural Research Institute as well as on farmers' fields show that an extra yield of two to six maunds of fibre per acre can be obtained by giving the crop a topdressing with ammonium sulphate.

Ammonium sulphate should be applied at 100 pounds per acre when the crop is one to  $1\frac{1}{2}$  months old, after the first weeding and thinning operations. Before application, the fertilizer should be thoroughly mixed with four to five times its volume of dry earth. This way, the fertilizer can be uniformly distributed, and the leaves of the crop will not be burnt.

In the case of *Capsularis* jute, the increase in fibre yield can go up to, it is found, four to eight maunds per acre, if the dose of ammonium sulphate is increased to 200 pounds per acre.



## DOUBLE AND TRIPLE CROPPING

The practice of growing a second crop of paddy after jute is becoming popular in some parts of Bengal, bringing in an additional income to growers.

The practice of double and triple cropping in jute areas is being widely recommended by the Jute Agricultural Research Institute.

In demonstration trials, growing a second crop of rice after jute brought farmers an additional Rs.69 per acre on an average. Similarly, a pulse crop after a late crop of jute gave an additional income of about Rs.63 per acre, and a vegetable crop after jute under irrigated conditions, about Rs.265 per acre.

Growing a third crop in the sequence jute - paddy - pulse in low-lying lands subject to floods, or in *beals*, or where irrigation is possible, brought an additional income of Rs.54 per acre from the pulse crop.

## NIGER

### BETTER-YIELDING NIGER

A better-yielding niger, N-12-3, suitable for growing in the Bombay-Deccan, has been recently evolved at the Agricultural Research Station, Niphad, in Nasik District of Bombay State.

Niger is one of the minor oilseed crops grown in Bombay State, mostly in the Deccan. The crop is grown under conditions of moderate rainfall not exceeding 40 inches in the hilly tracts. Besides oil, niger yields an oilcake which is a good cattle feed.

The new variety has given better yields when tried on farmers' fields. It also has a higher oil percentage.

## RICE

### SESBANIA AS GREEN MANURE

Sesbania is proving a valuable green manure crop for rice in Nizamabad District of Telangana in Andhra Pradesh.

Rice farmers in the area were so far familiar with only Sannhemp, *pillipesara* and *dhaincha*, which they used to grow for green manuring the *abi* (monsoon) rice crop. These green manure crops, however, could not be grown in the cold weather of November to January for green manuring the *tabi* (summer) rice crop which is in the field from January to April-May.



Sesbania was tried for two years at the Agricultural Research Station at Rudrur. The seed was sown in September and when the crop was harvested in the following January, it yielded over 17,000 pounds of green leaf per acre.

Farmers in the Nizamabad area are, therefore, advised to grow Sesbania as a green manure crop for the *tabi* season, wherever they take an early *abi* rice crop.

### GOOD RESPONSE WITH PHOSPHATES

Most Indian soils lack in phosphates. This is seen in the results obtained from a large number of trials recently conducted all over the country.

In these trials, good increases in yield of rice were obtained when the crop was fertilized with phosphates.

On an average, with an application of  $1\frac{1}{2}$  maunds of superphosphate, an extra yield of 3.6 maunds of paddy was obtained. The extra yield obtained was 4.9 maunds when the dose of superphosphate was increased to three maunds.

Farmers, therefore, are advised to apply phosphates also to their rice crop, especially when the soil is low in phosphorus content.

### FERTILIZING PADDY

'Placing' of ammonium sulphate was found to give an additional yield of over seven maunds of paddy per acre compared to broadcasting, in experiments recently conducted at the Indian Agricultural Research Institute, New Delhi.

Farmers normally apply the nitrogenous fertilizer to paddy by broadcasting.

In the experiments, one set of plots received ammonium sulphate applied broadcast and spread uniformly, and puddled in; in the other set of plots, the fertilizer was drilled five inches deep under the seedlings in rows.

It was seen that the plots where the fertilizer was broadcast gave about 61 maunds of paddy per acre as against about 68 maunds obtained from the other plots by 'placing' the fertilizer.



## RIDGING IN PADDY

Ridging the rows of paddy plants in the field has been found to give a higher yield of paddy per acre, in an experiment conducted at the Indian Agricultural Research Institute, New Delhi.

The crop for the experiment was raised in a sandy loam of average fertility.

The ridging of the crop was done with a hand-ridger 45 days after the crop was transplanted.

The ridged crop gave an acre-yield of nearly 68 maunds of paddy as against 62 maunds from plots in which no ridging was done.

## TOBACCO

### BIDI TOBACCO

A new variety of *bidi* tobacco has been evolved at the Agricultural Research Station, Nipani, Belgaum District, Mysore State.

The variety, S-20-2, gives 12 per cent more yield on an average over the local *bidi* tobacco grown in the Nipani area. Apart from the higher yield, this variety fetches five rupees more per maund because of its superior quality.

The yield of this variety can also be increased by 12 to 15 per cent by adopting certain improvements in the cultivation practices which are: (1) transplanting seedlings in the field in the last week of July or the first week of August instead of the latter part of August or September; (2) allowing a spacing of  $3\frac{1}{2}$  feet x  $2\frac{1}{2}$  feet instead of the usual  $3\frac{1}{2}$  feet x  $3\frac{1}{2}$  feet; (3) topping the plants at 10 leaves instead of at a higher number of leaves.

## IMPROVED CULTURAL METHODS FOR HIGH YIELD

How a few, simple improved methods of cultivation can produce excellent results with flue-cured tobacco crop was demonstrated the other day at the Central Tobacco Research Institute at Rajahmundry (Andhra Pradesh).

By adopting the improved cultural methods in one of the demonstration plots, the yield of cured leaf was found to be as high as 1,542 pounds, of which 66 per cent was bright-grade leaf. The leaf-size was found to be as much as 32 inches x 22 inches, the leaf having very good quality, texture and body.



The improved methods adopted were: deep cultivation in summer, using composted tobacco stalks as manure, deep placement of fertilizers and mulching the crop with paddy straw.

Farmers can also raise similar crops of flue-cured tobacco. They can give the fields the deep cultivation in the summer months either with a tractor when available, or by hand-digging. Tobacco stalks can be easily composted before the monsoon, after crushing them under a roller or a cart. The compost can be spread in the fields in July (three months before planting).

With a simple bullock-drawn implement evolved at the Institute, farmers can fertilize deep. Mulching can be done with either paddy straw or any other cheap stuff like twigs or grass after the first interculturing, about three weeks after planting.

## WHEAT

### DIBBLING - A QUICK WAY OF MULTIPLYING SEED

The dibbling method of sowing wheat, which is able to cut down seed requirements to about an eighth of what the farmer usually sows but without decreasing the yield in any way, is being advocated in Uttar Pradesh.

The method usually succeeds well in a field of high fertility and a good moisture condition at sowing time.

A cheap wooden dibbler is being made use of for sowing wheat by this method. With this implement, 12 to 13 persons sow an acre of wheat in straight lines. The distance between rows is kept at nine inches, and from seed to seed,  $4\frac{1}{2}$  inches.

Many farmers have produced 40 to 50 maunds of wheat by sowing only six seers of seed in an acre by this method. The extra cost involved in this method is more than compensated by the saving in seed alone.

The grains produced by dibbling are found to be generally heavier, and the ears longer. The plants are healthier and less susceptible to diseases. The lodging tendency is also reduced.

### LINE-SOWING OF WHEAT

Wheat farmers in Saurashtra are told that drilling their wheat crop in only one direction not only produces a better crop, but also offers other benefits.



Farmers in the area usually drill their wheat with a spacing of 18 inches between rows, and repeat the operation on the same land in different directions. As a result, when seeds germinate, the crop looks as if it was broadcast and not drill-sown.

In trials conducted on research farms, line-sowing gave an increase of 23 per cent in yield over the crop drilled in the fashion followed by farmers.

Other benefits obtained by line-sowing the crop are : a saving in seed (sometimes as much as 20 pounds per acre), in the time required for sowing an acre, and in labour charges.

As line-sowing enables farmers to complete their sowings in time, the crop escapes the ravages of the rust disease, which is more acute in late-sown wheat.

## GREEN MANURING WITH SANNHEMP

The wheat yield shot up by over 50 per cent when an irrigated wheat crop was green manured with Sannhemp in a recent experiment at the Agricultural Research Station at Niphad in Nasik District in Bombay State.

The Sannhemp was sown in June at 60 pounds to the acre. The crop gave 27,000 pounds of green matter for burying in the soil in August. The wheat crop was sown in November.

Farmers in the area are being advised to sow Sannhemp during the early showers in June and also plough the same in early, as otherwise the crop would grow too woody and will not decay in time.

Earlier experiments in the State had shown that burying a crop of Sannhemp as green manure gave better results than the application of 30 cartloads of cattle manure per acre.

## FEEDS AND FODDERS

### SILAGE FROM BERSEEM

A silage of excellent quality can be prepared from berseem.

At the Indian Agricultural Research Institute, New Delhi, the silage is prepared by mixing berseem with oats straw or green oats, which serve as absorbents.

Layers of oats straw are placed between layers of chaffed berseem. The oats straw absorbs the juice that flows out of berseem in the process of silage formation.



Berseem silage is best prepared in large-sized circular silo pits. The fodder is firmly pressed and compacted in the silo pit so that all air is excluded.

It is also found that berseem from the March-April cuttings is best for silage-making.

### RHODES GRASS

Rhodes grass yields well if properly fertilized. Trials show that if you apply 120 pounds of nitrogen per acre to the grass, you get 465 maunds of green herbage per acre per year. Without nitrogen application, the grass yields about 235 maunds of herbage per acre.

Under sewage irrigation, as high a yield as 650 maunds per acre per year has been obtained.

Give the grass a basic dose of ten to 12 cartloads of cattle manure. In addition, give four to five maunds of ammonium sulphate and  $1\frac{1}{2}$  maunds of superphosphate in two equal doses, in the spring and at the beginning of the monsoon.

Trials also show that growing a mixture of Rhodes grass and lucerne (a legume) not only improves the nutritive value of the fodder, but the legumes will also help the grass to grow better.

### NAPIER GRASS

The yield of Napier grass can be very much increased if properly manured.

Before planting the grass, apply 12 to 15 cartloads of cattle manure per acre. Topdress the grass every year with six to eight maunds of ammonium sulphate, preferably in three or four doses. The topdressing should begin in February and end in October.

In fertilizer trials, by following such a manurial programme, the yield of fodder rose from 335 maunds to 410 maunds per acre.

The *kudzu* during *kharij* and *senji* (legume) during *rabi*, make a good mixture with this grass, increasing the yield of its fodder. *Senji* will begin supplying fodder when the Napier grass is dormant.

### FORAGE GRASSES

How yields of pasture grasses can be increased has been shown at the Hill Grasses Research Station at Palampur in the Kangra Valley of the Punjab.



At the Station, the yield of *sarwala* (*Heteropogon contortus*), a common hill grass, was found to be double with the application of nitrogen and phosphate.

As against the normal yield of about 97 maunds of the grass per acre, when a fertilizer mixture containing 17 pounds nitrogen and three pounds phosphoric acid and another containing 15 pounds nitrogen and five pounds phosphoric acid were applied, the yields went up to 185 maunds and 192 maunds per acre, respectively.

## FRUITS

### BANANA

#### SUNBURN IN BANANAS

Every year, banana bunches in many plantations get damaged due to sunburn. With certain precautions, such damage can be avoided, and the fruits saved from loss.

The first precaution every banana-grower should take is not to space the plants wider than what is normally prescribed. A thick foliage in the plantation protects plants from sunburn.

The older leaves of individual plants that dry and hang down should not be removed, as they protect the stem from sunburn. All exposed stems should be covered with dry banana leaves, especially in the tall varieties. All exposed bunches and peduncles (main stalks of the bunches) should be carefully covered with dry banana leaves.

#### PROTECTING THE BANANA CROP FROM LOW TEMPERATURE

The growth and fruiting of the banana plant is badly affected by low temperatures; as a result, the yield goes down.

Horticultural experts point out that by adopting certain measures, such damage and loss in yield can be prevented.

If shelter-belts of tall trees are provided in the banana garden, they protect the plants by helping stop the cold winds from blowing into the orchards.

Certain varieties of bananas are comparatively more tolerant to low temperatures than others. For example, *Walba* (*Kullan*), *Virupaksby* and *Sirumalai* and the cooking banana (*Bankel*, *Khasadia*, *Monthan*, *Bontha* or *Kanch Kela*) can tolerate low temperatures to a great extent. Such varieties should be selected for planting.



The banana should be planted as early as possible at the beginning of the hot weather, so that the growth and flowering of the plants would be complete before the winter sets in.

Irrigating the orchard when the temperature is likely to go down has also been found useful, but not when low temperatures are continuous.

Smudging helps keep up the temperature. This is done by heaping dry rubbish with green material at convenient distances to be lighted at night. The smouldering fire creates a thick smoke-screen over the plants.

## CITRUS

### BEST TIME FOR BUDDING CITRUS

Experiments in Uttar Pradesh show that budding operations in citrus can best be done in June.

Budding in June gave a percentage success of 78 to 84 as against that of 43 to 48 only among buddings made in September-October. Shoots were also seen making better growth where buddings were done in June.

June being a slack month, labour is easily available.

Budding the stock in the first fortnight of June, just before the onset of the monsoon, is, therefore, being recommended in the State.

## FIG

### AIR-LAYERING OF FIG

Air-layering has been found to be a cheap and time-saving method of propagating the fig at the Fruit Research Station at Kodur in Andhra Pradesh.

The common nursery practice is to propagate the fig by cuttings.

Air-layering, as practised at Kodur, consists in removing the bark about  $\frac{3}{4}$  inch long, in a full ring on a selected shoot. A pinch of 'Seradix-B3' is dusted or smeared over the exposed portion. The operated portion is next covered with a handful of moist sand and wrapped with Alkathene film (150 gauge), the ends of which are secured round the shoot and tied to the thread. The ends of the wrapper again are wound over with a piece of adhesive tape to prevent water or air from getting in.

In about ten days' time, rooting is seen. In another ten days, the shoot is ready for separation. This method has been found to give cent per cent success.



## LITCHI

### BETTER VARIETIES OF LITCHI

Many fruit growers find litchi-growing a profitable venture. But, they often do not pay sufficient attention to the selection of the proper variety.

To get good profits, commercial growers should select for planting those varieties which have a good demand in the market, and avoid inferior varieties poor in quality and flavour, which do not bring in good income.

For commercial growing, they should select such varieties as *Early Large Red*, *Rose Scented*, *Gulabi*, *Kalkattia* and *Late Seedless*. The last two are comparatively resistant to hot winds (*loo*) and can very well be grown in the hotter regions of the country, provided sufficient water is available for irrigation.

## MANGO

### MANGO GRAFTING

Mango growers usually collect stones (seeds) of mixed varieties of mango from the streets and wayside places during the harvest season, and sow them in pots for raising stock plants for grafting later on.

This is not a good practice. To get healthy, quick-growing stocks which will grow to the right size for grafting in the shortest time possible, fruits of a selected country mango tree known for producing vigorous seedlings should be collected and their seeds extracted for growing stocks.

If this is not possible, good, plump, healthy, full stones should be sorted out from the mixed lot collected and sown first in a small bed. After about two months, the most vigorously growing seedlings among them should be planted in pots.

### SELECTING A GOOD MANGO GRAFT

To ensure that they purchase only good grafts from nurserymen, mango growers should see to it that:

- (1) the graft has both its scion and stock stems of equal thickness (the scion may be a little thinner, but never thicker than the stock);
- (2) the scion is straight-growing with plenty of broad, dark green, healthy leaves;



- (3) the union between the stock and the scion has perfectly healed, so that there is no hollow or unfilled space between the two stems;
- (4) the union is at least six inches above the root collar of the stock and not lower;
- (5) the string or tape used has not deeply cut into the tissues of the graft-joint;
- (6) the top of the stock above the union is removed;
- (7) the graft has been made from a genuine scion tree of a reputed variety.

## PAPAYA

### CO.1-A NEW STRAIN FROM COIMBATORE

A new strain of papaya, called Co.1, has recently been released by the Madras Department of Agriculture.

Co.1 papaya is a strain of the well-known *Ranchi* variety. It bears fruit at a low height of two feet six inches, facilitating early and better development of fruit and making harvesting easy. In the *Ranchi* variety, fruits are borne at a height of four feet six inches from the ground.

The unfavourable odour of the fruit in the *Ranchi* variety is almost missing in the new strain. Each fruit weighs three pounds, on an average, with uniform colour of flesh and skin.

The crop raised from the seeds of the strain is uniform in size, shape and quality.

## PINEAPPLE

### PROPER SPACING IN PINEAPPLE

The spacing between pineapple plants and between rows differs in different areas, depending upon the method of planting adopted.

Experience points out that the most convenient spacing to adopt is at least three feet between plants and six feet between rows.

Such a spacing gives a chance for full development of the plants, and also makes cultural operations and the subsequent picking of fruits easier. In a closely-planted plantation, particularly with varieties like *Queen*, which suckers profusely, the gathering of fruits becomes a difficult and painful work.



Proper spacing also facilitates re-planting of the interspaces, which is to be done after every four or five years.

### RIGHT STAGE OF PICKING PINEAPPLE

Pineapple fruits meant for the market should be in a green but mature stage, when only a slight yellow colour has appeared on the skin. The fruit should never be picked in the immature green stage.

The harvesting should be done with a sharp knife, severing the fruit stalk with a clean cut and retaining only about two inches of the stalk. The crown should be retained, as its removal quickens the ripening process, thus reducing the life of the fruit.

The fruit should be handled carefully, as any injury caused to the skin will make the fruit rot quickly in storage or in transit.

### MANURING PINEAPPLE

The pineapple crop requires adequate manuring to give a good yield.

Experience shows that normally, 25 to 30 cartloads of farmyard manure should be applied as a basal dressing. This should be followed by a topdressing of a fertilizer mixture of 50 pounds ammonium sulphate, 220 pounds superphosphate and 40 pounds sulphate of potash per acre. This mixture should be applied in two equal doses - once during March-April at the time of flowering and the second with the advent of the monsoon.

In a poor soil, the quantity applied may be increased; in a rich soil, the same may be proportionately decreased.

### GENERAL

#### SOME TIPS ON BETTER MILKING

Milking to be efficient should be carried out quickly, quietly, completely and carefully, dairy experts point out.

Before milking, it is better that the animal is helped to let down her milk. Normally, this is done by gently massaging the udder or by suckling the calf. But, if grain is fed to the animal immediately before milking, she comes to associate this act with milking, and immediately lets down her milk.

Once stimulated, the animal should be quickly milked. Slow milking or prolonged stripping makes the animal develop the habit of slow let down.



Milking should be complete. If incomplete milking is practised, the animal will get dry sooner. The last portions of the milk drawn contain a higher percentage of fat. If the animal is not completely milked, the milk drawn will naturally have less of fat.

The animal should be milked gently, without causing any injury to the teat or udder. Milking with the closed thumb is a bad practice, and should be discouraged.

### BRINE-CURING OF HIDES

Brining, or immersing cleaned hides in a saturated solution of salt, has been found to have greater advantages over wet-salting commonly followed in curing hides.

In brining, the hides are immersed in the saturated salt solution for 24 hours, after which they are drained over poles and spread out. Salt may or may not be applied again. The hides are properly piled till transported to the tannery.

Experience shows that brine-cured hides are superior to wet-salted ones. Brine-curing gives a greater protection under adverse conditions. Even during long storage, such hides do not get 'salt stains.' Again, they do not need any washing prior to soaking them in the tannery. They also need much less of soaking.

Leather obtained from brine-cured hides has more fullness and a brighter grain side.

### BIHAR HAND PUMP

A new portable hand pump, called the *Bihar Hand Pump*, has been devised by the Department of Agriculture, Bihar, for lifting water for irrigation.

The pump can directly be used in three-inch tube-wells and for lifting water from such sources of water as roadside ditches, reservoirs, ponds, rivulets and wells, where the suction lift does not exceed 20 feet. It works best when the lift is not above 12 feet.

With the pump, an average discharge of 1,500 gallons per hour can be had at a suction of ten to 12 feet. Where the lift is only about four feet, about 3,000 gallons is the discharge per hour.

### MANURES AND FERTILIZERS

#### SESBANIA AS GREEN MANURE IN ORISSA

Experiments at the Agricultural Research Station, Sambalpur, show



that the popular green manure crop of Madras, *Sesbania speciosa*, can be grown with success in Orissa too.

*Dhaincha* is already a popular green manure crop of the State, but these experiments show that *S. speciosa* grows more succulent and stands droughty conditions better than *dhaincha*.

State agricultural officials are now recommending to farmers that they grow *S. speciosa* on field bunds and waste lands for green manure.

They advise that the seed be first sown in nurseries, and when the plants have grown about nine inches high, they be lifted and transplanted.

Where irrigation facilities are available, they advise that the green manure be sown broadcast in the main field itself, but early enough to obtain sufficient green matter for the main crop.

### GREEN MANURES

Recent experiments conducted in Madras State to find out the worth of the green manure crops, *Sesbania*, *Sannhemp*, *pillipesara* and clusterbean under irrigated conditions have given some interesting results.

*Sannhemp* gave the maximum green matter at the end of one month, clusterbean at two months and *Sesbania* at three months.

Depending on the interval between the two crops, *sannhemp*, clusterbean or *Sesbania* can thus be recommended for growing as a valuable green manure crop.

Clusterbean, cut at the end of two months, gave 10,640 pounds of green matter per acre in addition to 500 pounds of green tender pods worth Rs.31-4-0.

### SUGARCANE TRASH COMPOST

Experiments at Padegaon in Bombay State show that the compost prepared from sugarcane trash is superior to the local farmyard manure in quality, and is suitable for application to the sugarcane crop.

The trash compost will also have the advantages of containing a lesser number of weed seeds and being cheaper in cost.

Compost from the cane trash can be prepared either by the heap method or the pit method. In the former, the heap should be six feet broad and four feet high, with any convenient length. It will require to be periodically turned.



Compost heaps are best made in June, after the material has been soaked by the early rains.

The quantity of cane trash compost recommended for application is 40, 30 and 20 cartloads, for the *adsali*, preseasonal and *suru* crops, respectively.

Half the quantity of the compost (or other bulky manure) should be applied before the second ploughing, and the other half in furrows before planting. This secures a better germination of sugarcane.

## COMPOST FROM PADDY HUSK

Experiments show that paddy husk, which is a waste product, can be put to a good use.

Compost prepared from the husk was found to be as good as farmyard manure, if not better.

To prepare compost from paddy husk, it is spread a foot thick in the cattle-shed and covered with a soft material like straw or litter, so that it may not prick the cattle. Cattle are allowed to rest on this husk bed. After every ten to 15 days, the bed is turned. The process is repeated for about two months, when the husk gets soaked with cattle urine and becomes softer.

The mass is then removed and put into a pit and composted in the usual manner.

## PESTS AND DISEASES

### PROTECTING THE CASHEWNUT

Root and stem-borers are the common pests of cashew plants. These burrow into the stem and root, and kill the tree in course of time. Plugging the holes made by them with cotton soaked in creosote oil and removing the dead and diseased twigs can control these pests.

Green leaf-eating caterpillars and dark brown thrips also cause damage to leaves and flowers. These can be controlled by spraying 50 per cent wettable BHC (Gammexane) at one pound in 25 gallons of water.

Among diseases, 'die-back', which causes drying up of the shoot from the tip downwards is widespread. Affected trees should be sprayed with one per cent Bordeaux mixture (five pounds copper sulphate and five pounds lime in 50 gallons of water). All dried and diseased twigs should be promptly removed and destroyed.



## COCKCHAFER ON COCONUT

Coconut gardens in some parts of the West Coast suffer badly due to the attack of the white grubs of cockchafer beetles.

The grubs appear in the soil in large numbers in the basins of the coconut palms soon after a few showers are received, and feed on the main roots and their branches. The leaves of the attacked palms turn pale yellow as a result, and the yield gets reduced. If neglected, the grubs can do very heavy damage.

A good control can be had by drenching the affected soil with spray fluids of BHC or incorporating BHC five per cent or 'Chlorodane' five per cent dust into the soil.

## EPILACHNA ON POTATO

The Epilachna beetle, which is a widespread and destructive pest of the potato crop, can be completely destroyed by dusting the crop with five per cent DDT at 30 pounds to the acre.

Both the adult and the larva of the pest feed on the leaves of growing potato plants, causing a considerable loss in yield.

The control measure can be more effective if the dusting is carried out at the very first appearance of the grubs of the beetle on the potato plants.

## POTATO CUTWORMS

Treating the soil with five per cent DDT dust at 30 pounds per acre is found to be effective against potato cutworms. The treatment should be carried out before the potato is planted.

The cutworms damage the potato crop considerably in the field. The caterpillars which live in the ground feed on the young, growing potato seedlings at night time. Growing sprouts may also be damaged while still in the ground. When the cutworm attack is severe, even tubers will be damaged.

Instead of DDT, 'Aldrin' (five per cent dust) at 20 pounds per acre can also be used with advantage.

## STRIGA CONTROL

Three methods are being recommended for controlling striga - the root parasite of the *jowar* crop. The parasite multiplies very rapidly. A single



plant can produce 30,000 to 40,000 seeds in a season. The seed can remain dormant in the soil for ten to 15 years.

The methods recommended are :

(1) grow crops other than *jowar*, *bajra* and sugarcane for a number of years;

(2) repeatedly intercultivate crosswise, and weed the field to remove the striga plants before they flower;

(3) spray a sodium salt of 2,4-D. A solution of one to 1¼ pounds of this salt in a 100 gallons of water will be sufficient for spraying an acre. It may be necessary to repeat the sprayings if the striga attack is severe. A single spraying will cost about six rupees per acre. When spraying, however, take care that the chemical is spread only on narrow-leaved crops, as it is injurious to broad-leaved crops like *tur*, *urd*, *mung*, *bbindi*, tomato and brinjal. Wash the sprayers and buckets used for spraying before using them for any other purpose.

The suggested control measures should be adopted for a few successive years, so that striga may be completely eliminated.

### WHITE ANT TROUBLE

Farmers can now fight the white ant trouble with easily available chemicals like BHC and 'Aldrin.'

White ants are found infesting fields in many areas, especially in the *barani* areas. They feed on seed, seedlings and plants in such fields.

When there is white ant trouble, the fields should be treated with BHC or 'Aldrin.' Five pounds of ten per cent BHC or ten pounds of five per cent BHC will be sufficient to treat an acre. If it is 'Aldrin,' 25 to 30 pounds of two per cent 'Aldrin' or ten pounds of five per cent 'Aldrin' are needed to dust an acre. Such a treatment can be taken up with preparatory cultivation or with the sowing operation.

In case fields cannot be treated before sowing, or if a treated field still has white ants left in it, 'Aldrin' emulsion (two pounds in ten gallons of water) should be sprayed over the field and the field hoed to mix the chemical well with the soil.

Farmers are also advised to locate white ant mounds and destroy the white ant colonies, particularly in uncultivated areas round about the fields. These will help in a more permanent control of the pest.

### FIELD RAT TROUBLE

Field rats cause damage to crops in many areas. Using poison baits is now being widely recommended as a good method of controlling them.



The bait is made with three per cent zinc phosphide (by weight) mixed in 97 per cent (by weight) of a carrier like crushed *jowar* maize, gram, wheat or barley and a just sufficient quantity of any vegetable oil to make the mixture slightly greasy.

The carrier is soaked in water for 15 minutes. Then it is drained, air-dried and mixed with zinc phosphide. A chhatak of any cheap vegetable oil like sarson, *til*, or groundnut oil for every five seers of bait is added. The addition of the oil makes the bait attractive to the rats.

The first thing to do is to locate all rat burrows in the fields and close them. Those which are found open on the following day should be baited. An ounce or half a chhatak of the bait rolled in paper should be inserted two to three inches inside the burrow. After the bait has been introduced, the burrow should be closed. If found necessary, the burrows should be baited again on the third day.

Rats also destroy stored farm produce and other household articles. Poison baits can be used to control rats in households too.

Since the bait is poisonous to human beings, cattle and poultry, every care should be taken to keep people or cattle or poultry from having access to it in the field or in the home. It is a good precaution to use hand-gloves for preparing the bait or handling the same.

Good results would be obtained if the rat control is conducted after sowings as well.

### FRUIT FALL IN APPLES AND PEARS

Many factors cause the drop of fruits in apples and pears during the pre-harvest period. Such a fruit fall means a loss to the farmer.

Early varieties are more liable to drop their fruit than the later - maturing ones.

One cause of the drop is the formation of corky layer at the base of the fruit stalk. This is due to the lack of a hormone in the plant. Spraying the tree with a proprietary spray containing Naphthalene acetic acid at ten parts per million has been found to prevent the fruit drop in such cases.

High winds and overcrowded bunches also break stems, increasing the fruit drop. Good pruning and proper thinning, however, will remedy these defects.

### PANAMA DISEASE OF BANANA

Caused by a fungus, the wilt disease of banana, popularly known as Panama Wilt, is found in most banana-growing countries. It affects several varieties of banana.



The disease affects young suckers as much as the full-grown plants carrying bunches. First, the outer leaf blades turn yellow and dry up. The leaf stalks next break close to the trunk. The stem shows well-marked longitudinal splitting of the leaf base just above the soil level. Often, the plant dies before flowering, but when bunches are borne, the fruits ripen unevenly and prematurely.

On cutting the underground stem of an affected plant, the cut surface shows red, black or brown streaks. In a healthy stem, the cut surface is uniformly white.

The fungus which causes the disease lives in the soil, and plants when once affected do not recover. Suckers obtained from such plants are also, in most cases, diseased.

When the disease appears in a garden, applying lime at the rate of one ton per acre to the soil will be useful in killing the fungus in the soil. Flooding the infected area has also been found effective.

Certain varieties of banana are found to be resistant to the disease. Hence, wherever the disease occurs, it is better to grow disease-resistant varieties.

### MOSAIC ON BHINDI

Pull out and destroy all diseased *bhindi* (lady's finger) plants immediately you notice an attack of mosaic disease on the crop.

Plants infected with mosaic can be easily detected because of the bright yellow colour shown by the mid-ribs of leaves. They may also be curled and twisted.

Caused by a virus, mosaic is a common disease of the *bhindi* crop. In some areas, it kills the crop completely. As the disease advances, affected plants get dwarfed and produce small, malformed and pale fruits with a tough skin. The market value of such fruits is very much reduced.

The *bhindi* field should be kept free of weeds, because a tiny insect, the white fly, which spreads the disease, multiplies in such weeds. In fact, the insect should be destroyed by spraying or dusting chemicals.

### KATTE DISEASE IN CARDAMOM

Experiments in Bombay State have shown that the *katte* disease of cardamom can be completely controlled by removing and destroying diseased plants from the garden and transplanting only disease-free seedlings.

The disease has been causing serious losses to cardamom growers for the last many years.



It has also been found that the disease is carried from infected plants to healthy ones by an insect known as the Banana Aphid. Hence, it is necessary that healthy seedlings are not transplanted in the garden for six months to a year after the diseased plants have been removed.

### WILT OF PEAS

Sowing the peas crop late, avoiding the sandy soil for growing it and adding sufficient quantity of cattle manure to the soil to improve its water-holding capacity are some of the steps experts recommend for controlling the wilt disease in peas.

The disease causes a good deal of damage to the peas crop in Poona and North Satara Districts of Bombay State, and also in Delhi.

When wilt attacks the peas crop, it can be easily detected. Plants here and there, or in patches, in the field appear yellowish. Affected plants show a downward curve of the young stipules and leaflets, and grow stunted. The leaves wither progressively upwards.

When diseased plants are noticed, they should be carefully dug out along with their roots and burnt.

There are as yet no varieties of peas known to be resistant to wilt. Varieties *Bonneville*, *First to Report* and *Phenomenon* are, however, less susceptible to the disease as compared to other varieties such as *Mahableshwar*, *Laxton's Progress*, *American Wonder*, *Early Badger* and *Early Grant*.

### 'SOFT ROT' IN GINGER

Applying the 'Cheshunt' compound to ginger plants has been found to be very effective in controlling the 'soft rot' disease.

This has been seen in trials carried out at the Agricultural Research Station, Wyanaad, in Kerala State.

The 'Cheshunt' compound is prepared by taking 11 parts (by weight) of ammonium carbonate and two parts of copper sulphate, powdering them separately and then mixing them thoroughly. The mixture is stored in air-tight containers for 24 hours. A solution is next made by dissolving an ounce of the compound in two gallons of water. This solution is applied to the base of the affected plants at about six ounces per clump.

It was also seen that splashing of this compound on the rhizome bits when they are placed in their individual pits before planting, further helps in getting over the 'soft rot' troubles.

Many growers have achieved cent per cent success in controlling the disease with the compound.



Investigations also show that growers should avoid clayey or water-logged soils and prefer open-textured loams for planting ginger.

Other measures recommended for controlling 'soft rot' are :

adopting a crop rotation instead of growing ginger after ginger ;

selecting disease-free rhizomes and also dressing rhizomes selected for planting with wettable 'Ceresan' 0.25 per cent concentration (four ounces in ten gallons of water) for half an hour, spreading the treated rhizomes in shade for drying and then storing them till required for planting.

### CONTROLLING COTTON ANTHRACNOSE

Disinfecting the cotton seed with an organic mercurial compound before sowing is being recommended as a method of controlling the anthracnose disease of cotton.

The disease appears in the Khandesh area of Bombay State in a serious form in years of heavy rainfall. It causes seedling blight in the early stages and boll rot if the humidity is high at the time bolls are formed.

As a result, yields go down and the quality of the *kapas* is also spoiled.

The seed can be disinfected by dressing it with the organic mercurial compound in a revolving drum, or by besmearing the seed with mud paste to which the disinfectant has been added.

Two ounces of the mercurial compound will have to be used for every 15 pounds of the seed.

Thinning the crop at the time of the second interculture is considered a good practice in checking the disease.

As a preventive against the disease, the crop in the boll-forming stage would also have to be sprayed with a copper compound twice or thrice in September.

It is also essential to avoid cotton after cotton to prevent infection of the disease from one cotton crop to the next.

### YELLOW LEAF DISEASE OF ARECANUT

Preliminary trials at the Central Arecanut Research Station in Vittal (Mysore State) show that it is possible to control mites which cause the yellow leaf disease in arecanut palms.



The yellow leaf disease goes by such names as *chovakedu*, *karim-puthal*, plague, *vasantha*, *kattu* and leaf disease, and is marked by trees having pale yellow leaves and drooping crowns. Due to the disease, the yield of the trees goes down.

The mites can be controlled by either spraying wettable sulphur (an ounce in two or three gallons of water) or 'Folidol' (two c.c. per gallon of water), or by dusting lime plus sulphur (2:1).

In spraying or dusting, however, the lower surfaces of leaves which harbour the mites are to be thoroughly sprayed or dusted.

The spraying or dusting may start early in December when the mites start breeding and may be repeated, if necessary.

### TREATING SEED AGAINST DISEASES

Wheat and barley seed can be treated against diseases at very little expense.

The wheat crop generally gets such diseases as bunt, flag smut and foot rot, and the barley crop smut, stripe and other leaf spot diseases.

For these diseases, the seed should be treated with organo-mercurial compounds like 'Agrosan GN' and 'Ceresan.' Eight *tolas* of the chemical would be needed to treat a maund of the seed.

For treating wheat or barley seed with the chemical, seed-treating drums are being made available by State Governments and the Plant Protection organizations of the Government of India. Such a drum can treat about 15 maunds of seed in eight hours.

Individual farmers can also use earthen *chatties* or *gharas* or metallic drums with tight lids for the purpose. The containers are to be filled  $\frac{2}{3}$  with the seed to be treated. After adding the required quantity of the chemical the lid should be closed and the *chatti* or *ghara* rotated for about three to six minutes to ensure a thorough mixing of the chemical with the seed. If a drum is used, it can be rolled on the ground for proper mixing.

For treating seeds this way, farmers will need only five annas worth of the chemical per maund of seed.

Farmers are advised that they should treat their seed within about two weeks of sowing time, and after treatment store the seed in a dry place. They should not inhale the chemical or allow its particles to fall on any part of the body. It is safer to treat the seeds in the open than in closed rooms. They should also not use treated seed for consumption or for feeding to their animals.



In Delhi, the Plant Protection Directorate of the Government of India is making available to local farmers a petrol-engine-driven seed-dressing machine, which can treat about 800 maunds of seed a day so that the needs of an entire village can be easily met.

### EARCOCKLE IN WHEAT

The Earcockle disease, prevailing in certain wheat-growing areas, can easily be controlled.

The seed collected from a crop affected by Earcockle will have hard, brown, deformed seeds which are actually Earcockle galls. These galls will have a large number of disease germs inside. Hence, the galls have to be separated from the seed before sowing. To separate the galls from the seed, immerse the wheat seed containing the galls in ordinary water in any container. Stir the seed vigorously. The galls will float on the surface of the water when they can be easily removed and destroyed by burning. Do not allow the wheat seeds to soak in water for long, as then the gall seeds will also absorb water and sink and separation will be difficult.

After the galls are removed, drain away the water and dry the seed and keep it in a dry place till sowing.

### SMUT IN JOWAR

More farmers are now treating their *jowar* seed with sulphur before sowing as a measure against the control of the smut disease.

The smut disease, when it appears on the crop, causes a reduction in *jowar* yield. Since the disease is carried by seed, treating the seed with sulphur powder is a sure way of getting over it.

An ounce of finely ground sulphur is sufficient to treat 15 pounds of seed *jowar* needed for sowing an acre. Treating this quantity of seed will cost but four naye paise.

The seed can be put in a *chattie* or *ghara* or a metallic drum with a tight-fitting lid, the sulphur added and the container shaken for three to four minutes.

### STEM ROT DISEASE IN GRAM

When young gram plants start rotting completely, it is a warning to farmers that it is due to an attack of the stem rot disease (*tana aur shakhon ka gal sar jana*).



In the case of older gram plants, complete or partial wilting may also be seen. The shredding of stem and branches may also result.

The disease is caused by a fungus. It first shows itself through a patch, straw-brown in colour, on the stem. If cold weather continues for several days, this cottony growth spreads on all the above-ground parts of the gram plant.

Diseased plants turn yellow, thereafter brown, and ultimately wilt and dry up.

Once the disease appears, it will affect the gram crop in the next season also, if the crop is grown in the same field. Farmers will, therefore, have to take precautions to prevent its recurrence.

This can be done by :

1. carefully removing all crop debris after gram harvest, and either destroying the same, or composting it, and the manure thus prepared used only for cereal crops ;
2. obtaining gram seed from a disease-free crop for the next year's sowing ;
3. irrigating the field after a deep ploughing with a soil-inversion plough ;
4. avoiding a water-logged field for sowing gram ;
5. rotating gram with crops like wheat, barley and oats, which are not attacked by the disease.

## POULTRY

### MOULTING IN HENS

Poultry farmers are advised that they should take advantage of the moulting period of hens to select superior layers and breeders from among the flock.

Early or slow moulters are poor layers as a rule. As such, these should not be used for further breeding. Birds which are poor in constitution or which tend to put on fat or porcupine-like feathers, should be culled out.

Birds can be helped to start laying early through proper feeding and management. They should be given four to five ounces each of a well-balanced mash; the quantity should be increased as the birds redd up for laying.



One or two per cent of shark-liver oil added to the mash has been found to be beneficial to the birds. Fresh greens and calcium grit and oyster shells should also be made available to the birds.

## CANNIBALISM IN POULTRY

Crowding of chicks or birds in small enclosures is a major cause of cannibalism in poultry birds.

Cannibalism, also known as feather-pecking, is a serious vice among chicks as much as among grown-up birds. The vice spreads quickly in large flocks, and, if not checked in time, causes serious losses.

Apart from overcrowding of the birds, lack of protein and calcium in the diet also makes chicks and birds peck at their neighbours. Once the vice enters the flock, hard work and patience on the part of the poultry-keeper will be required to overcome the same.

When there is cannibalism in your flock, first find out the cause for the same. If it is due to overcrowding, put the birds in larger enclosures. If it is due to a defective diet, feed them with a mash rich in protein or calcium.

If, in spite of these steps, the birds do not discontinue the habit, 'debeaking' them will be the only remedy. This is an operation by which the upper beak of each bird is shortened. It is necessary, however, that all birds are 'debeaked.'

## FISHMEAL IN POULTRY RATION

Fishmeal is an important animal protein supplement, and should be included in rations given to poultry birds.

Sometimes, groundnut cake is added to the ration instead of fishmeal because of economy. Research has now shown that though groundnut cake supplies the necessary quantity of proteins, it does not supply the amino acids, minerals and vitamins needed for growth and production in poultry birds.

Where groundnut cake is used, there should be at least five per cent fishmeal in the final mash to supplement the proteins of the ration.

## FEEDING POULTRY

Lack of a proper feeding routine for poultry birds results in a fall in egg production in laying birds and slower growth in young chicks, poultry-keepers are warned.



Birds should be fed according to the feeding scales and the timetable recommended for the area concerned.

Egg-yield will go down seriously and the growth of young birds will slow down if there is not enough animal protein, such as fishmeal or meat offal in the daily mash. There should be animal protein as well as available protein in the diet given to the birds.

If whole grains are not included in the daily ration, the digestive power of the birds is badly affected.

If green food, such as lucerne or lawn clippings, is not included in their diet, poor growth and low resistance to diseases will result.

Common salt is necessary for birds. Lack of it in the diet will lead to poor digestion and ultimately poor development.

If shell grit is not made available in hoppers or boxes, either the laying will stop or the eggs produced will be soft-shelled. Shell grit is no substitute for stone grit. The latter is also required by young as well as grown up birds to help them digest the food.

Lack of sufficient clean water interferes with the digestion and egg-laying of birds. The water should be kept in the shade.

It is not good to encourage feeding outside the fowl-house, especially when the runs are not well-protected from crows and sparrows. Feeding birds by scattering grain on the ground is a poor way of feeding them as they tend to pick up infection from the ground.

## SHEEP

### EYE TROUBLES IN SHEEP

Sheep should be protected from eye affections. Their eyes get affected due to direct or mechanical injuries, or due to irritation caused by certain irritants. If neglected, the sheep may go completely blind, after which they cannot be maintained economically.

The first symptom of any eye affection is the flowing of tears from the affected eye. When such a condition is noticed, the owner should detect and remove the cause of the trouble. If some foreign body, such as a thorn, is seen in the eye, it should be gently removed and the eye washed with boric lotion. A few drops of shark-liver oil put into the affected eye thereafter will be sufficient to cure the eye completely. If necessary, the eye should also be fomented with warm boric lotion.

The building in which sheep are housed should be well-ventilated, and all the doors and windows should be kept open throughout the day.



The droppings should be removed every day. The shepherd should handle his sheep gently and be careful while using a stick to drive them.

If these precautions are observed, eye troubles among sheep can be kept down to the minimum.

## VEGETABLES

### CABBAGE

#### WATER NEEDS OF CABBAGE

The cabbage crop needs a continuous supply of moisture to develop well.

The crop, therefore, needs to be irrigated once a fortnight. The irrigation water, however, should be used carefully once the heads begin to mature. If the crop is heavily irrigated when the heads are well-developed and quite firm, quite a number of them will split in 24 hours.

It is good to till the soil between irrigations. But the tillage should not be so deep as to disturb the root system of the crop.

#### DEFECTIVE CABBAGE PRODUCTION

The formation of the seed-stalk before the cabbage head is formed, and the failure of the leaves to form a solid head are the two common defects met with in the cabbage crop.

The defects have been found to be due to many causes. Some of these are the early sowing of the seed due to which the crop is affected by hot weather; a warm winter; extreme changes in temperature; a check in the growth of seedlings in the nursery-bed; use of seed with poor germinating capacity; poor soil; carelessness in proper and timely weeding, pest and disease control; insufficient manure application; use of poor seed.

#### CABBAGE SEED

The 'stump' method of producing cabbage seed has been found successful under conditions in Kalimpong, West Bengal.

The 'stump' method consists in raising seed from decapitated stumps of cabbages as against the common 'Head Incision' method, which consists in giving the cabbage head two vertical cuts at right angles from the top without injuring the bud.

By the 'stump' method, about  $2\frac{1}{2}$  ounces of seed per plant could be produced; it also took less time to produce the seed.



Another advantage in this method is that it adds to the producer's income since the heads after decapitating can be marketed.

## CARROTS

### FERTILIZERS FOR CARROTS

The carrot crop gives a good yield with fertilizers.

When preparing the seed-bed, two maunds per acre of sulphate of potash or muriate of potash should be applied to the land.

Farmyard manure is best applied to the previous crop, as an application of fresh or coarse manure to carrots makes their roots spongy and coarse. The dose to be applied is ten to 12 tons to an acre.

Topdressing with  $1\frac{1}{2}$  to two maunds of ammonium sulphate per acre further increases the yield of carrots.

## CAULIFLOWER

### FERTILIZING CAULIFLOWER

Among vegetables, cauliflower requires the heaviest manuring, especially when it is a main season crop.

In some localities, as heavy a dose of farmyard manure as 70 tons per acre is applied. However, in no case will a dose of less than 40 tons per acre be sufficient, if the best yield is desired.

At the time of preparing the field for transplanting, two to  $2\frac{1}{2}$  maunds of each of superphosphate and potassium sulphate should be applied.

Later, ammonium sulphate at five maunds per acre should be applied as a topdressing, in three doses: one maund after seedlings have set in the field;  $2\frac{1}{2}$  to three maunds three to four weeks after seedlings have set; one maund to  $1\frac{1}{2}$  maunds when the heads have started to form.

### POOR QUALITY IN CAULIFLOWER

Many factors are responsible for the poor quality of cauliflower heads obtained sometimes, especially in the early crop.

In such cases, the plants head prematurely or produce undersized heads or 'buttons.' Plants producing 'buttons' are small, their leaves not covering the developing heads.

'Buttons' are found developing when the soil is of poor quality or when the seedlings are kept too long in nursery beds. They are also found when nitrogen or water supply is deficient.



If the seed used be of poor quality, no good-sized heads can be formed even under very good conditions. Poor heads also result when the growth of the seedling or the plant gets checked. Seedlings for planting should not be too large or 'leggy.' Such plants get stunted and produce small heads.

Other factors responsible for poor head formation are: a hot and dry weather; hard frost and low soil and air temperature; poor control of weeds, insects and diseases.

### A GOOD MARKET FOR CAULIFLOWER

Better prices are obtained if the cauliflower is of good quality. The cauliflower head should be solid and compact. It should also be white.

Due to certain causes, heads sometimes turn brownish or yellowish and lose their attractive appearance. They may even get an unpleasant flavour.

To improve its quality, the head should be subjected to darkness for a small period before harvest. This is done by breaking one of the outer leaves and covering the head with it two or three days before harvesting.

## ONION

### PRODUCING ONION SEED

Farmers do not at present pay much attention to the size of onion bulbs in seed production.

In experiments conducted at Ludhiana in the Punjab, bulbs of three sizes were planted for the production of seed. The big-sized ( $1\frac{1}{2}$  to two inches in diameter) and the medium-sized (one to  $1\frac{1}{2}$  inches in diameter) gave 134 per cent and 75 per cent more seed yield, respectively, than the small-sized (half to one inch in diameter) bulbs.

Though big-sized bulbs gave the highest yield of seeds, the initial cost of the bulbs and the transport is high. Therefore, medium-sized bulbs should be preferred for seed production. Planting of medium-sized bulbs has proved most economical for the production of onion seed.

## PEAS

### FERTILIZERS FOR PEAS

Peas (*mattar*) to yield well, need to be properly manured.

Under north Indian conditions, application of commercial fertilizers over a basal dressing of well-decomposed farmyard manure at eight tons to an acre pays well.



Peas like potash, and hence potash should be applied to the crop as potassium sulphate at two maunds to an acre.

At pod-formation time, a light dressing with a maund of ammonium sulphate per acre gives very good results.

## POTATO

### GREEN MANURING POTATO

Farmers in the Nilgiris (Madras State) can increase their potato yields by green manuring with lupins.

In the Nilgiris, three crops of potatoes are taken. All the three crops can be supplied with lupins as green manure. After lifting the main crop in August, lupin seeds can be sown and covered. This green manure is forked in during December for the incoming potato crop to be planted in March next.

For the second crop coming in July, lupins can be sown in the preceding March-April and ploughed under in June. For the irrigated crop planted in February, the green manure can be sown in May-June and ploughed under in November.

A seed-rate of 60 to 100 pounds of lupins will be found sufficient. The normal crop yield is from three to five tons of green manure per acre.

Lupins can also be sown over uncultivable wastelands and along field bunds for seed production.

### RURAL POTATO STORES

Trials carried out at the Patna Regional Station of the Central Potato Research Institute show that potatoes can be conveniently stored in rural potato stores.

Such a store has double walls of *kachha* bricks with a six-inch space between the walls. The air gap between the walls provides a good insulation against heat. The roof of the store is covered with a thick thatching material and country tiles during the rainy season.

More openings are provided at the base and the top of the outer wall. These help the air between the walls to be renewed. These openings can be opened at night and closed during daytime, when necessary.

The air inside the store can also be renewed through the openings provided on either side of the gable walls near about the roof level. These openings can be closed at night.



A door with two windows provided on the northern wall makes a quick fall in the inside temperature of the roof possible when the outside temperatures are lower at night.

Under Patna conditions, it has been found that with these facilities, the temperature inside the store can be kept 20° to 25°F lower than the outside temperature.

### SUCCESSFUL POTATO STORAGE

A few precautions have to be observed if potatoes are to be successfully stored.

Store only clean, selected and graded potatoes. Place the tubers on wooden bamboo racks. The layers should never be more than a foot deep.

It is better to cover the potatoes with sand. Covering successive layers of tubers with river sand to the thickness of about an inch helps prevent tuber moths from attacking the potatoes. The potato moth can also be controlled by pretreating the tubers with five per cent DDT. Mix the DDT with fine dust and apply at two ounces per maund of potatoes before storing.

Examine the tubers from time to time for sprouts and for rotting. Remove the sprouts in case they are excessive during the later period of storage. If you see tubers rotting, it will be necessary for you to sort out rotting tubers from time to time.

When storage is done under country methods, store only such varieties that can withstand high temperatures in storage.

### SWEET POTATO PLANTING SWEET POTATO

Experiments in Bombay State show that the top portions of the sweet potato vine are better than the middle or bottom ones for planting, as these give better yields.

Hence, the tender shoots and the woody basal portions of the vines selected for planting should be rejected.

Only well-matured, disease-free vines should be selected for cuttings. The cuttings should be nine to ten inches long. After clipping the leaves, the cuttings should be dipped for eight to ten minutes in a solution of a pound of 50 per cent wettable DDT in 25 gallons of water. This treatment will keep the cuttings free from fungus diseases like black stem rot and pests like sweet potato vine borer and weevil.

### PRUNING SWEET POTATO VINES

Pruning of all lateral shoots of the sweet potato vine to a particular



length leads to an increase in sweet potato yields. This was seen in an experiment conducted at the Agricultural College, Coimbatore, Madras State.

By pruning the vine, its vegetative growth is checked, and the increase in yield may be possibly due to the greater enlargement of the roots.

In the experiment, vines were pruned to one foot, two feet and three feet. The pruning treatment generally promoted increased yields as compared to the untreated vines.

The rolling of vines also appeared to reduce the yield to a certain extent.

## TOMATO

### IRRIGATING TOMATOES

Be careful how you irrigate the tomato crop. Irrigation is not needed for tomato in the humid regions, but the crop cannot be produced without irrigation under dry conditions.

In the hot weather, irrigate the crop once a week or every ten days, but during winter, use the irrigation water sparingly. Too much water at this time makes plants drop their blossoms.

Irrigate during periods of frost. It will prevent the soil temperature from going too low, thus preventing the ill-effects of frost.

Heavy watering when the soil is rather dry makes the fruits crack. Excessive watering late in the season may make the fruits watery and of poor quality.

It is a good rule to irrigate the tomato crop in such a way that the soil is continuously kept moderately wet.

### HARVESTING TOMATOES

The stage at which tomatoes are to be harvested depends on the way you want to dispose of the fruit.

For canning and processing, pick the fruit at the 'full ripe' stage, as the fruits will be used up in 24 hours. At this stage, the fruit is fully coloured, and feels soft to the touch.

For table use, pick at the 'ripe' stage; most of the fruit surface will be red and pink, but no softness is felt.

For the local market, pick when the fruit is 'pink' or 'turning pink.' There will be a trace of pink at the blossom end, but the surface will mostly be pink.



For the distant market, prefer the 'mature green' stage. The fruit at this stage is still green, but full grown, the pulp surrounding the seed-cavities is jelly-like and the seeds give way before the edge of a sharp knife. Some varieties of tomatoes show a light colour or a whitish area at the blossom end at this stage.

## WEED CONTROL IN SUGARCANE

Supplementing the usual cultural practices for putting down weeds with the use of chemical weedicides in the sugarcane field results in not only a good control of weeds, but also in an increased yield of sugarcane.

In experiments at the Indian Agricultural Research Institute, New Delhi, pre-emergence spray of the weedicide 2,4-D about ten days after the sugarcane crop was planted, at two pounds of the acid equivalent of the chemical in 60 gallons of water, was followed by giving one to three hoeings with a cultivator at intervals of three weeks or after each irrigation. This was found to keep the fields fairly free of weeds. In addition, the crop was also earthed. Subsequently, the field was given another spray of 2,4-D.

Such a combined weedicide-cultural treatment was found to bring in an additional per-acre yield of 64 maunds of cane or about Rs.624 as additional profit.

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## FARM BULLETINS

To meet the paucity of literature in a simple, yet authoritative form, the Farm Information Unit, Directorate of Extension, has planned a series of bulletins dealing with farming and animal husbandry subjects. Each of the Bulletins is so written as to give a general picture of farming practices in vogue in the country, and suggest improvements based on research results. The Bulletins, it is hoped, will be found useful by the farmer, the agricultural student and the Extension worker alike.

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