FACT

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Books and Pamphlets on scientific, industrial, agricultural and allied subjects are accepted for review in this Journal.

Editor

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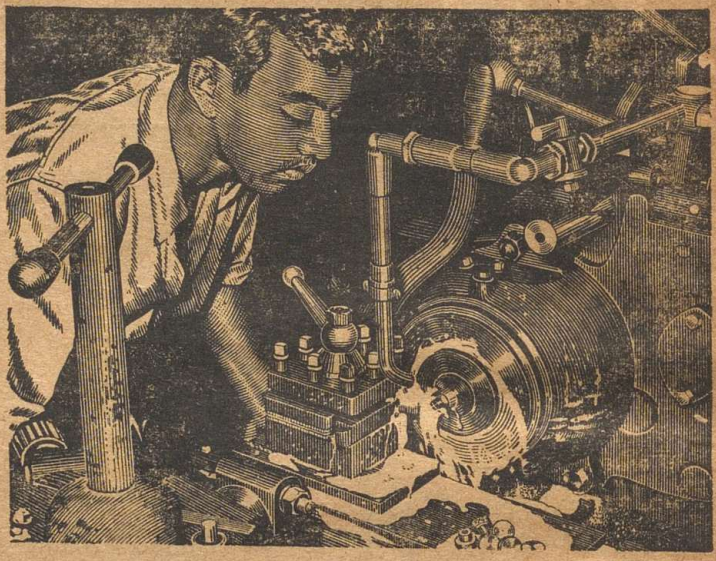
MALAYALAM

Even a lathe tool can't scrape off this oil!



Between a lathe tool and the work being machined, a cutting fluid acts as a lubricant. Under the enormous pressure at the tip of the cutting tool, the fluid is reduced to a film a few molecules deep.

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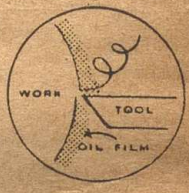

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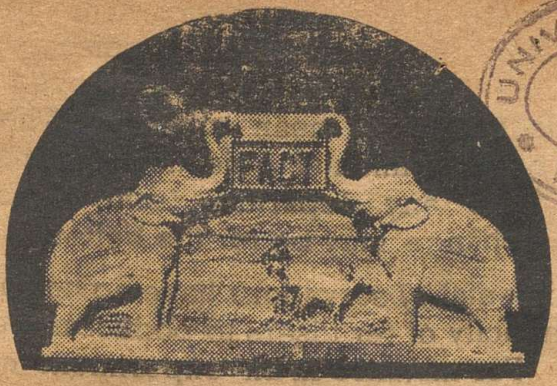

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EDITORIAL

NEED FOR CLEAR THINKING

"FROM time to time there has been much discussion on the question whether organic or inorganic source of plant nutrients is the best. It seems strange that in this twentieth century there should still be people who think that ammonia derived from organic matter differs in some subtle way from ammonia derived from gas liquor or produced synthetically", remarked Sir John Russel, Director of the famous Rothamsted Experimental Station, England.

Again, the Materials Policy Commission of U. S. A. (1952) put down in their report to the President, "Fertilisers applied scientifically and used with other fruitful farming practices are the corner-stone of the welfare of the nation. It is the one single method, above all others that will permit our farmers to meet our bigger future needs. Without more of it, the job *cannot* be done."

Let us not forget that this latter remark comes from a country that stands foremost in agricultural development and that consumes more than two crores tons of fertilisers annually. They are not satisfied with this consumption rate, but are going ahead with their plans to increase the production and consumption of these vital plant-nutrients.

Against this background, against the overwhelming field data to prove the usefulness of fertilisers in farming, we hear now and then sharp, sometimes virulent, criticisms.

These charges are in most cases couched in vague language. Words such as "ruining the land", "poisoning the crops", "destroying the fertility", etc. are employed. These are strong words, but do not mean anything. These criticisms are nothing but sentimental objections issuing from those who always hate any departure from status quo, even though such a change may be for the better.

Experimental observations have again and again confirmed the capacity of fertilisers to poduce more when used intelligently. For instance in an experiment conducted at Rothamsted from 1852 to 1946, a plot that received 1392 lbs. of fertiliser annually out-yielded the plot which received an annual application of 15.7 tons of organic manure, *all through* this extended period of nearly a century. In fact during the final five years the difference between the two plots was 4.4 bushels of wheat per acre.

There is really no need for any controversy at all regarding the use of fertilisers in agricultural practice. Both the organics and inorganics are supplementary to each other and when used jointly will give out a bumper yield. It is wrong to attempt a comparison between these two, for each of them does what exactly is left undone by the other. The organics improve the physical condition of soils by the production of humus but they are slow in their action and they contain only very little quantities of the vital plant nutrients, like nitrogen, phosphate and potash and have therefore to be reinforced by other richer and quick acting fertilisers.

A little bit of clear, unbiassed thinking will do away with all these unfounded criticisms. Fertilisers a re destined to play a vital role in stepping up food production and the sooner we realize it, the better it will be for our Nation. It is highly gratifying to note that both the Central and the State Governments have fully recognized the importance of fertilisers and are now going ahead with the task of popularising their general use by our farmers. More fertilisers mean more food!

Editorial Board

Utilization of some Indigenous Sources of Manures

M. A. IDNANI,
Assistant Agricultural Chemist, Indian Agricultural Research Institute, New Delhi.

SOILS in India are notorious for their poor crop production capacity. The average yield per acre is perhaps the lowest in the world but it has been amply demonstrated that yields comparable to the highest recorded anywhere, can be obtained with special attention to judicious manuring among other things. It is recognised that the low level of nitrogen generally found in Indian soils constitutes one of the chief limiting factors which is responsible for the poor growth of crops. The deficiency of this essential element arises from the high temperatures prevailing under the tropical conditions which quickly burn up organic nitrogenous residues in the soil so that it is difficult to obtain the optimum amounts of nitrogen and organic matter necessary for plant growth in our soils. One of the most fruitful methods of increasing crop yields in India therefore lies in the liberal use of nitrogenous manures and fertilizers. It is estimated that the minimum requirement of this type of manures in India is of the order of 2-3 million tons of nitrogen. Of this, some 75,000 tons are imported and about 9,500 tons manufactured in the country. It would therefore be fruitful at this stage to undertake a survey of a large variety of nitrogenous waste materials available in the country which can be put to profitable use as manures and pressed into service for this purpose. An outline of scope in this field is given below.

Farmyard Manure

The value of this traditional manure has been examined by many workers and the available evidence indicates that apart from its other beneficial effects on the soil, farm-yard manure is in quantity and quality a low grade and slow acting nitrogenous manure. The average nitrogen content in farmyard manures used in India does not exceed 0·5 per cent. The nitrogenous compounds present in a fermented manure of this type are of complex chemical nature and low availability, which may often prove inadequate to meet the requirements of growing crops under Indian conditions. While there is considerable scope for improving the quality of farmyard manure by proper incorporation of the urine fraction and preparation of manure in pits instead of heaps, experimental evidence indicates that a combination of this with fertilizers and manures of higher nitrogen availability would be more useful for Indian soils.

Blood Meal

Blood from slaughter houses is a source of a valuable manure which does not appear to have

received the attention that it deserves in this country. On an average about 2 lb. of liquid blood per goat head and 12 lb. per cattle head are obtained. One hundred pounds of liquid blood yield 20-25 lb. dry blood meal. It is estimated that over 20,000 tons of dry blood meal for manurial purposes could be gathered from this source annually in India. Blood manures contain 8-11 per cent nitrogen which has been found to be 80 per cent as efficient in crop producing power as ammonium sulphate.

Blood can be dried by adding 1-3 parts of lime to 100 parts of liquid blood. This immediately forms a solid cake which readily dries in air without putrefaction.

Meat Meal and Tankage

Offal from slaughtered animals and meat that is unfit for human consumption can be useful raw materials for manure preparation. When subjected to steam pressure of 50-60 lb. for a few hours and then dried, the materials can be ground to powder which may contain 9-11 per cent nitrogen. This type of manure goes by the name of meat meal. Whole carcasses of dead animals can be treated in this way, in which case the bones also get included in the manure. The composition of this bone tankage varies from 3-10 per cent nitrogen and 7-20 per cent phosphoric acid. It is considered that a good quantity of this material could be profitably utilized in a large country like India.

Leather Meal

Scrap leather from the manufacture of shoes and leather goods and unserviceable animal hides and old leather articles can be processed with steam or sulphuric acid to yield a nitrogenous manure of value in crop production. The material can then be ground to a powder which may carry 6—11 per cent nitrogen.

Hoof and Horn Meal

Hoof and horn meals are also by-products of slaughter houses and result from the processing, drying and grinding of hoofs and horns. The processed meal is a high grade nitrogen source and may contain 15 per cent or more of nitrogen.

Hide, Hair And Wool

Hair and wool are obtained as wastes from industries dealing with manufacture of finished articles from these. By processing with steam or sulphuric acid they yield a fine powdery manure containing 8-14 per cent nitrogen.

Bat Guano

This guano which forms another interesting source of manure comes from the dung, refuse and bodies of bats accumulating in caves and similar hideouts. Little has been done in India to explore deposits of this valuable manure. Bat guano may contain up to 12 per cent nitrogen and 14 per cent phosphoric and should prove an effective manure for Indian soils.

Fish manure

Utilization of fish not suited for other purposes as a manure is an old practice in many countries.

Dried powdered fish may contain 8-10 per cent nitrogen and 4-15 per cent phosphoric acid. With the long coast-line of the country, there is considerable scope for catching large quantities of inedible fish which can be processed into an excellent organic manure.

Human Hair

This material available in some quantity from hair cutting saloons in large towns has been utilized with profit as manure in China and Japan. By treatment with steam or sulphuric acid, the material can be reduced to a powder yielding 10-14 per cent nitrogen of high availability. It is estimated that about 17,000 tons of this manure could become available from the male population of the country.

Night Soil

The value of night soil as a manure of high quality is established by the high level of fertility of lands in China where its utilization has been practised for a long time. While considerations of public health and hygiene do not warrant its use in the raw state, it is possible to reduce the material to a powder by mixing it with materials like soil, ash, charcoal powder, saw-dust, etc. Such 'poudrettes' have been found by experiment to be valuable manures for Indian soils. The amount of this manure that could be made available annually is estimated at 35,00,000 tons, containing 2-3 per cent nitrogen along with various other nutrient elements.

Human Urine

This fraction of the human excreta, known for its high value as a nitrogenous manure has found little application in agriculture so far due to lack of a suitable method for its collection and conservation. This practical difficulty has been overcome in the design of 'Agri-San' urinals evolved in this Institute, which can be put to effective use for this purpose. It is estimated that about 1·5 million tons of nitrogen can thus be made available annually from this source for use as manure.

Wild Leguminous Plants

Leaves and seeds of a number of wild leguminous plants analysed in this laboratory, have been found to contain 3-6 per cent nitrogen, in addition to substantial quantities of phosphorus, potash, lime and other elements and in actual crop growing tests they proved highly useful for increasing yields. It would be possible to collect these materials in substantial quantities particularly from forests and transported where required after drying.

This brief outline of the scope for the utilization of a variety of materials available in the country, does not cover the whole field of such unconventional sources of manures which could be exploited with profit and is intended to stimulate interest in this direction. The need for undertaking a fuller survey, is in the first instance indicated, to explore these and other sources of such materials which could go a long way in meeting the requirements of the country.

MECHANISED FARMING

B. M. LAKSMIPATHY, Joint Director of Agriculture, Madras.

WHENEVER the subject of Power Farming is discussed, the first question asked is "whether mechanisation of agriculture is necessary and desirable and, if so, in what form it should be planned." There are no two opinions today that the term "Mechanisation" should be applied in a broader sense to the use of implements and tools worked by human, animal or machine power. In all agriculturally advanced countries, both in the East and West, efficient and economic power supply has been the 'sine qua non' of progressive agriculture. Advanced countries have now largely replaced animal power by machine power and there is a steady progress in designing and using cheaper and more efficient machine power. Agriculture in our country is still mostly dependent on manual and animal power as "Mechanisation" was not encouraged in the pre-war years in which amazing advances have been made in all the western countries.

One of the principal factors contributing to increased yields and low cost of production is the use of efficient tools, implements and machinery It is generally acknowledged that animal and human power in our country is not employed in agriculture as efficiently as it is in other advanced countries. The implements used are age-old and much of the field work is done with inefficient human power and tools. When compared with other countries, the cost of production of crops in our country is high, and this is accounted for by waste of human and animal power for simple agricultural operation. Considering this wastage, mechanisation of agriculture in this country is not only desirable, it is imperative.

Better Employment

Fears are frequently expressed that mechanisation will lead to mass unemployment. There was considerable opposition in western countries early in the 19th century to the introduction of power machinery on this ground, but the progressive advancement in those countries proved that the logic was not correct, since mechanisation has led to many new industries developing, giving better employment to all, making living more confortable and, at the same time, raising the standard of living of the working class. There are great potentialities of new industries springing up, centering round products and by-products of agriculture and the population released by mechanisation will be simultaneously absorbed in this industrial development, particularly cottage industries.

Organised attempts to mechanise agriculture in this country on a broadbased plan were taken up with the cessation of hostilities in 1945, when certain parts of the country were threatened with famine and the Defence Department came forward with their machinery and equipment to help the Civil administration in tiding over their difficulties. The Thompson Mission transferred a large number of power pumping-sets and tractors with dozer attachments for supply to farmers on a subsidised basis, with financial assistance from the Government of India on a liberal scale.

This was the real start given to agricultural mechanisation and power farming all over the country in 1946

The first Five-Year Food Production programme for Madras State was drawn up in 1947 and in this first plan, due importance was given to land reclamation with a view to bringing under food crops not only new areas, but also the old fallows that had gone out of cultivation for reasons beyond the control of the farmers. According to this original food production plan, a fleet of 300 tractors and bull-dozers was proposed to be built up and new areas amounting to 75,000 acres were programmed to be reclaimed by these mechanical units.

The Departmental units have so far assisted in the reclamation and cultivation of more than 2½ lakhs of acres in this State

Tractors and bull-dozers owned by the Department are employed not only for land reclamation and cultivation operations, but also for large-scale soil movement and excavation works. In fact, they can be put to varied and very many uses with efficiency, economy and saving in time. The heavy type track machines are fitted with dozers and shovels and these combinations are in increasing demand all over the State. For certain kinds of reclamation operations, there is no alternative except the tractor and this is so not only from the point of efficiency but also of considerations of economy. There has been a spectacular increase in the work performed by these heavy tractors with bull-dozers from year to year and there is a long list of waiting applications in many districts.

Land reclamation with tractors and extensions to mechanical cultivation is one of the important items under the Agricultural schemes in the first Five-Year National Plan (1951-52 to 55–56.) So far as Madras State is concerned, this plan is proposed to be systematically pursued to bring the maximum area under both food and other crops during this five year period.

Role of Co-ops.

Generally the feeling among agriculturists and the public is that the small size of the average holding and the present agrarian policy of the State Governments

are the factors which would restrict the use of tractors. It is here that the Co-operative organisations and State-owned units have their part to play in raising the level of the ordinary cultivator and helping in improving the living standards. There is very great scope for further extending the provision of tractor facilities by State Governments and also for co-operative ownership and use of tractors.

A lead has already been given by the Nellore District Wholesale Co-operative Stores in this regard and they are doing excellent work with their units. It is worth noting in this case that they have a well-equipped service-and-spares set-up to ensure the better maintenance and proper working of their machines.

There is also scope for contract ploughing by enlightened farmers who could operate a larger number of tractors than they need for their own farms. In the districts of Bellary, Krishna and Guntur, contract ploughing has been started by a few enterprising owners and in course of time this is bound to expand with the growing tractor-consciousness among cultivators.

Another factor which would restrict the use of tractors is the prevalent opinion that suitable methods of tractor cultivation have not been evolved for paddy lands although there are established advantages in using tractors and they are cheaper in the long run where the farms are large.

The new rotary cultivation practice and the introduction of the "Rotavator" attachment to tractors provide the power operated implement for both dry and wet cultivation of paddy fields. It is also an ideal implement for the direct incorporation of standing green manure crops into the puddle or even green leaves spread on the field. Rotavation gives an excellent puddle which has a greater moisture holding capacity than when worked with the ordinary ploughs and has proved more advantageous in respect of crop growths and in withstanding droughts successfully. Under puddled conditions, paddy fields worked with the Rotavator require less water for irrigation than when cultivated with normal tillage implements. This is a distinct gain and advantage to paddy raised under wells by lift irrigation and results in considerable saving of water.

These power-farming units have a great role to play in the various irrigation projects also. For the rehabilitation of the families displaced under the Tungabhadra Project in the submerged villages, an extent of 4,500 acres of forest land has been cleared and levelled with the Departmental bulldozers and laid out in the form of bunded plots fit for cultivation. The initial ploughing and harrowing of these newly converted areas were also carried out by the tractor units held by the Department. This is a new venture executed with speed and economy involving the uprooting and removal of standing forests, laying of field bunds with the earth removed from the cleared areas

and the removal of roots and stumps left underground.

Urgent Needs

For the large area in the ceded districts to be benefited by the Tungabhadra waters to be speedily and fully developed from dry to wet cultivation, the lands have to be levelled, terraced and bunded to enable the raising of crops immediately after water is let into the channels. As the tract is sparsely populated and agricultural labour is also scarce and dear, the land owners have requested the Department to assist them in this with the bulldozers and tractor ploughing units. Government have also been requested to sanction long-term loans at reasonably cheap rates of interest to help the conversion of dry areas into irrigated fields. A pilot project covering an area of 6,000 acres in Kampli village near Hospet, which will receive water as soon as water is let out in the canals, has been sanctioned by Government, and work has already been taken up with the departmental bulldozers and tractors to level the fields into terraces and put up the field bunds to start paddy cultivation. As this is an area formerly subject to famine, the ryots are poor and do not have the ready money to pay the charges for the working of these mechanical units on their holdings. Their urgent needs are machines for conversion of their lands from dry to irrigated cultivation and money to meet this initial capital and improvement expenditure. It is here that mechanised cultivation can play its part fully and combine economy with speed in field operations.

—— By kind permission, The Indian Express, Madras.

So small, but so important!

Soil bacteria are incredibly small. Their average size is between one twenty-five-thousandth and one fifty-thousandth of an inch in diameter. Yet they multiply so fast that under ideal conditions, just one of them might in a day become the ancestor of 280,000,000,000,000 of its species!

Plants do not live on bacteria, it is true; but they cannot live without them.

Collective Bargaining in Industrial Relations

M. S. Thomas B. A., F. A. C. T. Ltd., Alwaye.

THE problem of Industrial Relations is a story of evolution starting with the Industrial Revolution. Wherever large scale production takes place in factories there is a constant challenge to the importance and independence of manual labour represented by the individual. Signs of industrial unrest become visible in the shape of a number of industrial disputes. In the early stages of industrial relations, the idea of negotiation usually occurred to both parties only after a strike or organised stoppage of work. But from here it was not a far step to the idea of negotiating with organised labour to prevent a stoppage and finally to the building up of a permanent machinery to deal with problems of labour as and when they arose.

The machinery for solving industrial disputes may be based on the principles of negotiation, mediation, voluntary and compulsory arbitration or adjudication. The structure of labour relations in Britain is established mainly on a voluntary basis. Questions of wages and conditions of employment of a great majority of workers in England are determined by collective agreements voluntarily entered into between representative bodies of trade unions and employers. Conciliation Officers of the Ministry of Labour keep in touch with both parties at all stages, and attend their joint meetings as observers or liaison officers, by invitation. Although compulsory arbitration was introduced in 1940, for the purpose of preventing war time production from being interrupted by industrial disputes, by the passing of the Industrial Disputes Order, 1951, the prohibition of strikes and lockouts had been lifted and the scope of compulsory arbitration has been very much reduced.

The principle of collective bargaining is generally accepted in U. S. A. also. But since the war efforts are continued in that country in a smaller degree even after the end of World War II, on account of the Korean struggle, labour organisations in U. S. A., have pledged to hold down strikes to a minimum.

Methods of arbitration seem to have an upper hand there for the time being. Industrial disputes are first tackled by representative bodies of both parties. When negotiation fails,

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The author recently underwent a short term course at the Institute of Labour Welfare Officers, Bombay, conducted by the Govt. of that State. — Ed.

the Conciliation Service of the state steps in and tries mediation. If the disputes are not settled there, they would be referred to National Defence Mediation Board, or later to the National war Labour Board for arbitration. One healthy feature in the industrial relations in U. S. A. is the absence of class antagonism between the employers and the employees.

Turning to India, the existing labour legislation provides machinery for collective bargaining as well as for compulsory arbitration and adjudication. The Industrial Disputes Act, 1947, provides for the constitution of works committees which will facilitate joint consultation at the level of undertakings. India is one of the thirty odd countries in which such machinery exists on a permanent basis and she is one of the 22, where this cooperation is enforced by legislation. The Act also provides for machinery like Boards of Conciliation and Industrial Tribunals, whose settlements and awards will be binding on the parties concerned.

But in some of the states in India, the machinery is different. For example in Bombay, under the B. I. R. Act 1946, there is provision for compulsory collective bargaining, compulsory conciliation, and compulsory and voluntary arbitration. If any change from existing conditions is required by either employers or workers they have to send a change notice to the other party. Compulsory negotiation has to be conducted over this question between both parties. If no settlement is reached, conciliation and arbitration automatically follow. The state intervenes at every stage under the Bombay Act, whereas under the Central Act, unless it is a public utility concern, the State officials are not bound to interfere in the disputes. The idea behind the Central Act is to leave the parties to themselves to meet together, discuss and decide things. The views of Mr. V. V. Giri, the Union Minister of Labour on the principle of collective bargaining are well known. In his opinion, "Active state intervention in disputes between labour and management is no more than a mere palliative and cannot produce lasting results." His long experience as a trade unionist has convinced him that collective bargaining is the most effective method for the settlement of disputes. It is his desire to eliminate the machinery for compulsory adjudication from the statute book But in his own words, "the large consensus of opinion at the present junctu.e is that, it is premature to consider any change in the present policy of selective and discretionary compulsory adjudication", and hence it appears that the question of making any drastic change in the basic policy governing labour-management relations in India is shelved for the time being.

Collective bargaining is one of the three acknowledged methods of trade union movement, the other two being mutual insurance and legal enactments. It will be interesting to know how this idea of collective bargaining developed gradually through the ages. Collective bargaining is the natural method of action by the workers. Workers combine because they know that when separated they are weak. It must also be remembered that it is the elementary instinct of man to combine for a common end. Once combined, all their actions are bound to be in a collective manner. The right for collective action was won over by the workers in Britain after a long and continuous fight. From 14th century, up to the year 1800, the affairs of workers, their wages and working conditions were regulated by the laws known as Statute of Labourers passed from time to time. Combination of workers were treated as illegal. The Industrial and Agricultural Revolution swept through England in the middle of 18th century. The ranks of wage-earners swelled and they showed a tendency to join together for collective action. The parliament introduced a more rigid law known as 'Combination Laws of 1799–1800' which made combinations of both workers and employers a criminal offence. But since the judges of the State were usually drawn from the employers and aristocratic classes, this law did not affect employers seriously. The working class was gaining strength day by day and in 1824 and 1825 'Combination Laws Repeal Acts' were passed, by which combination of workers was made no more a criminal offence. But the civil status and definite legal standing of trade unions was given only in 1871, by the Trade Union Act of 1871, which is considered as the Magnacarta of British workers. The principle of collective bargaining was recognised and acknowledged by employers and the State from this date. And today this is the principal method used by British Trade Unions for the betterment of the lot of the workers. This principle was recognized and legalised in all the civilized countries by the end of 19th century itself.

In the case of India, Industrial development and labour movement started very late. The first cotton mill in India was started in 1851 and the first jute mill was put up in Calcutta in 1855. Labour movement in India began to take shape only in the 1st quarter of 20th century, and the congenial soil for its growth was found in the grave economic difficulties that followed the World War I. The Swaraj Movement, the Russian Revolution of 1917 and the formation of International Labour Organization were other factors which helped the growth of Indian trade union movement. In

England the workers had to fight their way through the strong united front of employers, land lords, capitalists and the state. But in India, political leaders were courting the workers to put up a common front against the State and foreign capitalists. The British Indian Government were wiser by the lessons learned in their Home and hence without much delay, the Trade Union Act was passed in 1926, which legalised combination of workers for trade purposes.

The growth of trade union movement in India was very rapid. The first union was started in 1918, which was the Madras textile labour union. With the passing of the Trade Union Act in 1926, the progress was accelerated. In 1939—'40, there were only 667 unions. But in 1949—'50, the number came up to 3365. Although authentic data are not available, it is estimated that industrial workers in India number about 30 lakhs. Organized labour comes to nearly 26 lakhs. Considering that the percentage of organized workers to the total number of workers in U. S. A. is 37.5, Canada--30.0, U. K.—41.0 and Belgium 66.6, the pace of the growth of Indian trade unionism appears to be unique.

One outstanding characteristic of Indian trade unionism is that collective bargaining is the very life and foundation of our workers' organization. It is true collective bargaining is the natural method of action of workers everywhere. It is also true all workers of the world value the benefits earned by collective action much more than greater concessions given to them by employers voluntarily. But in India, the principle of collective bargaining has a greater significance. Here it is perhaps the only method of action followed by the workers' organization. In western countries trade unions carry on mutual insurance and co-operative activities as well for the welfare of their members. In England for example, even during the period when Statute of Labourers were in force, and workers were not allowed to combine for the purposes of bargaining, trade societies of workers were permitted to carry on their activities of mutual benefits. In India, excepting very few unions, trades workers' organizations do not carry out any regular activities like this. Hence their only method of action is collective bargaining and this has come to stay as a lasting feature of the present day set up of our country. And it is therefore very important for the workers, and for employers, and also for the State to know how to apply this principle in Industrial Relations for the benefit of all concerned with the Industry and for the general progress of the country.

In the first place we have to mark the different stages or spheres, where this principle is

made use of. There will be certain isolated undertakings, or undertakings of a special nature, where it is desirable to have collective bargaining on factory level. The representatives of the employer, and those of the employees in that particular undertaking can meet and bargain for either side and arrive at settlements. In the second stage, collective bargaining can be conducted on industry wide basis. Employers and workers engaged in the same industry in an area can negotiate and establish industrial agreements through their representatives. Finally there can be rational agreements also. But since these agreements are likely to affect different industries, where the nature of work and financial capacities will vary the national agreements will obviously be very broad in character. Very often separate agreements for each industry will be necessary, within the frame work of the national agreement.

Whatever be the nature of collective bargaining, if it has to be successful, strong organization on both sides is necessary. The employers and employees should have efficient representatives who should be experts in the subject of discussion. They should not only have a clear understanding of their own problems, but must have broader perspective or rather a constructive appreciation of the other party's problems as well. The workers' representatives for example must have a thorough knowledge about the problems of the employer, regarding supply of raw materials, distribution of finished goods, etc. They must also make a comparative study of the industry with other industries of the same nature The employer's spokesmen should be aware of the real difficulties of the workers' workload and nature of work of each individual worker or category of workers, inter-relation between various departments, cost of living of the workers based on scientific enquiry, and conditions of work of the worker of same category in other industries or undertakings.

Industrial disputes are generally based on two main issues. One is interpretation of existing agreements and the other is the question of establishing fresh agreements. It has been proved by experience that for the purpose of interpretation of existing agreements, arbitration by a third party is desirable. Professional lawyers can be engaged on both sides to argue their cases. But in the matter of establishing new agreements, presence of a third party will not be helpful. Dictation or coercion from an outsider will not be welcomed by either party. The representatives of both parties well have to sit together and discuss matters in a friendly atmosphere. But there are occasions when voluntary arbitration is useful, in the matter of formulation of new agreements also. The parties concerned may fail to arrive at an agreement on a particular aspect. This aspect alone may be referred to arbitration. The function of the arbitrator here will not be to award a judgment, but

just to supply a common place for both parties to meet and to see that they do not break away from each other for good. The moment, there are signs of an improvement in the atmosphere, conducive to a settlement, that is when both parties are again able to continue negotiations with open heart, arbitration can be discarded.

Collective bargaining has no chances of success when both the employers' organization and workers' organization are very young and weak. When the organizations are young, the leaders usually have a wrong notion that to yield to reason is a sign of weakness. On the other hand even when the organizations are sufficiently old, if their membership is not encouraging or if there is no discipline among their ranks, then again neither party will not be prepared to negotiate collective agreements. When one of the parties is very strong and the other is weak, it is natural that the weak party will always view the other party with suspicion, and a collective agreement is well nigh impossible. Under each of the circumstances mentioned above, arbitration will be more desirable and workable than collective bargaining. But when both the parties are strongly organized they prefer collective bargaining to any other methods of settlement. This aspect is illustrated by the procedure for settlement of industrial disputes in Ahmedabad Textile Industry. There are about 70 textile mills in Ahmedabad, and they have a very strong mill owners' association. The Ahmedabad textile workers' union is also one of the strongest trade unions in India. About 75% of the textile workers in the area are regular members of the unions. Both these bodies have entered into an agreement under the Bombay Industrial Relation Act, that all their disputes will be settled by themselves and when agreement is not reached they will accept the arbitration of a Board consisting of one representative of workers and one representative of employers.

Now dealing with some of the criticisms levelled against the principle of collective bargaining, in the first place it is alleged that collective bargaining involves an element of compulsion. Collective bargaining is conducted between representative bodies of two parties. These bodies may not represent a majority, much less the entire body of workers in an industry. But the agreements concluded between these bodies will affect all employees and employers alike whether they are members of the particular organisation or not. In the Bombay State for example, under the B. I. R. Act, 1946, the minimum membership required for a trade union to secure the right of representation is only 15% of the workers in the Industry. On the employers' side also there may be some individuals who may not favour the terms of a collective agreement.

This charge is partly true, especially in the light of legal enactment cited above. But as already mentioned, voluntary

negotiations and collective bargaining can succeed only if the organizations of both parties are equally matched and strong. If a workers' organization is strong, it must certainly have the backing of a majority of workers. Majority will is the basis of democracy which affords largest form of representation. It must also be noted that so long as a worker is able to continue in service as per his terms of contract with the employer, and so long as an employer is able to wind up his business or start fresh business, constitutionally their individual liberties, are not encroached upon.

Another draw back of collective bargaining is stated to be the ineffectiveness of collective agreement. It is feared that since there is no legal sanction for such agreements, they may not be faithfully kept. Here again, it is found that agreements are not properly kept when there are no strong organizations on either side. In the report of the Industrial council on Industrial agreements in 1913 (England) it is said where agreements are the outcome of properly organized machinery for dealing with disputes they are with very few exceptions loyally observed by both sides.

Sometimes collective agreements do not solve the problem completely. Even after agreements are signed by both parties, differences of opinion arise in its application and in the interpretation of the various clauses. This is considered by some people as a weakness of the principle of collective bargaining. But really speaking this is not a defect of the method of collective bargaining and this method cannot be discarded on this ground. Doubts and varied interpretations are likely to be raised about the terms of any sort of agreements or awards. In such cases the best thing to do is to refer it to an impartial judge for final verdict.

There was a time when employers viewed collective agreements with suspicion. But now the trend is very much in favour of collective agreements. This feature is because of the realization that if agreements are arrived at for individual undertakings, the financial commitments for each undertaking will vary and healthy competition between producers under same conditions will not be possible.

Collective bargaining has been very successful in industrial relations in England. There the machinery for negotiation had a voluntary and spontaneous growth, while the Government as far as possible kept aloof from the natural development of these bodies. Joint councils and trade boards in England not only help to solve industrial disputes but go a step forward and discuss matters of common interests for better utilization of practical knowledge of workmen. Although in India, the Industrial Disputes Act of 1947 has provided for works committees for joint consultation and settlement of disputes, works committees as a whole do not serve the purpose for which they are intended. In many industries they exist only in name. The main reason for this failure is because it is not the result of a spontaneous growth arising out of necessity felt by both parties, but that of legal enactment. Collective bargaining is sure to succeed only when both parties feel it necessary & useful.

Growth of Agricultural Science

T. S. R.

CHAPTER V.

"The brains of scientists have a habit of worrying at problems tirelessly. Though baffled again and again their keen minds maintain the endeavour till they finally fulfil their wishes".

Humus

THE term humus stands for decaying organic matter. It is the real organic content of a soil and its presence is absolutely essential for the maintenance of soil fertility. The quantity of humus varies in different soils. In swampy and peaty soils it may form the main bulk of the dry sample but in ordinary farm soils it is usually under five percent.

Even the prehistoric man knew that all organic matter, whether of animal or plant in origin, when left to itself will decompose to form humus. Since this natural phenomenon always happened as a matter of course, it was just taken for granted and no special attention was paid to it. Anything that is dead must rot and decay; such was the argument. But the curious scientist who loathed to accept anything for granted began to study this question of natural decay. He made a thorough study of the several aspects of this problem and as a result many strange truths till then unknown, were brought to light.

It was established that organic matter did not decompose *by itself*; but on the ther hand the decomposition was actually brought about by the positive activity of myriads of low forms of life, particularly the bacteria. The number of these tiny organisms, invisible to the human eye, might amount to several millions per cubic inch of soil. Again, this decay took place only under certain conditions such as optimum warmth, moisture, presence of available plant foods, lime, proper aeration, etc. It should be remembered that these bacteria are also living organisms; in fact they are also plants requiring available plant-foods for their development. Unfavourable conditions like extreme cold or heat, want of proper aeration, lack of adequate moisture, etc. retarded bacterial activity and brought it to a stand still. The organic matter under those conditions remained undecomposed and consequently useless to the plant.

A virgin soil

In a state of nature the humus supply of soils was found to be maintained by the roots of the decaying vegetation and the dead leaves that fell upon the surface. Under favourable climatic conditions the humus-content of a virgin soil could actually go on increasing. Thus there was really a self-improvement of the soil and the next crop of plants was always better than the one before it. That was how virgin forests came into being in those regions endowed with good rainfall and favourable temperature.

But a suitable climate was absolutely necessary for this self-improvement of a soil. In the case of a poor soil with unfavourable climate, the cycle worked in the opposite direction. The annual plant residues received by the soil were barely adequate to restore the natural wastage of humus and consequently the next crop was poorer than the one before it. The poor soil went from bad to worse. The deterioration proceeded inexorably until a balance was struck at which only an inferior class of herbage could hold the ground.

Thus, in a state of nature a good soil became better and a poor one worse. The laws of nature were quite rigid.

A farm soil

But man's selfish designs upset these laws. He came on the scene through organic evolution and to satisfy his needs he started farming, a technique of raising only those plants that were useful to him. He turned up the soil with his crude implements and tools and removed all the unwanted surface vegetation. When he did this, he let in air and sun's warmth into the very bowels of the upturned soil. Consequently the decay of the humus was quickened because of increased bacterial activity. The organic content of the soil was soon oxidised and burnt up. This depletion was further hastened by continuous cropping and harvests. Soil depletion went on at a rapid rate and yields began to fall. The prehistoric farmer just moved on to another region and turned up a new virgin soil; there was plenty of elbow room to move about. But with the passage of time he found that there was not enough land to be taken up anew. Moreover the laws of the land restricted his freedom and he could not be just moving about always. He had left his nomadic habits and he preferred his land to be located very near his dwelling. Something had to be done and that quickly, to keep up the yields. His common sense told him that what the soil wanted was just what had been taken away from it. So he applied all sorts of organic wastes, which, he knew fully well would decompose in the soil and produce the much needed humus. He was doing this regularly and in a liberal manner. He had plenty of herbage to collect round about his village and he gathered all the plant and animal wastes at the appropriate time and dumped them on his farm-soil. Thus things went on smoothly once again and the problem of soil depletion seemed to be solved once for all. But no other factors soon upset the balance.

The problem of feeding the soils

The world population was increasing at an alarming rate, inspite of frequent wars and famines and the problem of food became critical. Man was forced to produce more and still more food. He extended the area under cultivation alround. Since he

wanted not only food but various other commodities, such as oils, sugar, fibres, fodders, etc. he could not put all the area under food crops. However, the major portion of the total area under the plough was put under food crops. But because of the falling yields he had to replenish the soil losses in time so that productivity could be kept. He procured what all organic matter he could lay his hands on and dumped them on his land. If only a balance could be struck between the recurring soil depletion and the periodic additions of organic refuse, then there would have been no necessity for any other extraneous plant-foods. But the total quantity of organic wastes available was not adequate for feeding all the area. There was not enough to go round. Other supplies for plant-foods had to be tapped so that the soil-losses could be balanced.

Science lends a hand

Meanwhile agricultural science had developed sufficiently enough to throw more light on the substances which plants took up as food. It had been established that plants did not take the organic matter or the humus as such, for both of them were too insoluble. They had to undergo many changes before they could be assimilated by the plant. All these changes were brought about by bacteria. If proper aeration was available the humus got simplified. The final products would be simple salts containing combined nitrogen, phosphate, potash, etc. which could be sucked in by the plant-roots. The changes that happened to soil-humus were really a case of oxidisation ending in the production of carbon-di-oxide and water and consequently these final changes actually involved the disappearance of humus as such from the farm-soil, but they were quite necessary, for only through them the simplified plant-foods could be released to feed the crop.

In the absence of air and lime the humus was merely changed to acidic forms containing "humic acid" that rendered the soil sour. Acid humus accumulated in wet swamps because the water shut out the supply of air. Such acid humus was not useful to the crops.

A good farm-soil therefore not only required humus but it also demanded that the humus should decay and disappear in the process. In tropical countries like ours the loss of soil-humus would be at a tremendous rate, because sun's warmth also aided in the decay of humus.

The scientists pointed out that the plants took in only the simple salts set free by the humus at the tail end of its decay, and they argued that these simple nutrients could be directly fed to the crop. If this could be done, man would be freed from the impossible position of supplying all the plant foods for all his crops only through the form of soil-humus. He would have a short-cut in feeding his crops.

Of course it did not mean that humus would no more be needed. The agricultural scientist knew fully well the important role played by humus in a soil. He knew that humus could transform a dead soil into a living one and its presence could convert even pure sand or a brickfield into a garden. But he was quite against any sort of fetishism.

He had discovered the exact functions of humus in a soil. He catalogued the various physical benefits which it could bestow on a soil. After finding out all these, he put humus in its place. He could not agree that humus had some hidden magical powers which no other material had—a view put forward by the so-called "organic farmers." His intellect told him very plainly that it would be an impossible task if the plant-foods required by all the crops were to be supplied only through humus. A farmer should see that the humus-content of his soil did not go down beyond a certain level and for doing this he should apply organic manures to his crop-land periodically. Over and above these, the food requirements of the growing crops could be easily met by other more direct and richer sources. There was nothing wrong in this view; in fact it was the only practical method by which *the nation as a whole* could improve its agricultural production. This particular point was powerfully put forward by all advanced agricultural scientists and Liebig was their leader who led the crusade.

(To be continued)

Sir Jagadis Chandra Bose

Sir Jagadis Chandra Bose was the first Indian scientist to attain a world-wide reputation and the first to be knighted for scientific work.

He showed very plainly by the help of his delicate instruments that *plants have hearts.* The rate of pulsation of the plant sap is one-hundred-thousandth part of an inch per second, and this he proved by his Crescograph. Plant could perceive and react to wireless stimulation that is beyond the limit of human perception. He also showed that metals can be *killed* by posion.

Thus he was the first great scientist to prove that the three kingdoms of matter—the animal, the plant and the mineral—are *one in essence* and that the distinction drawn between organic and inorganic matter is based on a false assumption.

Kunnathunad-Chalakudy Community Project

Progress till 30th June, 1953.

THE Kunnathunad-Chalakudy Community Project was, like all similar projects, inaugurated on 2nd October 1952.

The Project comprises an area of 458 sq. miles.

The area has been divided into three development blocks for execution of programmes. The area and population of the three development blocks are furnished below:—

	Area (in sq. miles.)	Population (in lakhs)
First Block - 44 Revenue Villages.	211 —	2.25
Second block - 15 villages.	122 —	1.85
Third block - 23 villages.	125 —	3.56
Total	458 —	7.66

The term village has, as elsewhere on the west coast, only a significance in revenue records. There is no village system and people do homestead farming. It is also noteworthy that this Project is perhaps the most densely populated in India, the norm being 1.5 to 2.00 lakhs.

The headquarters of the Project is at Chalakudy. Work has started only in the first development block.

The total Project Budget for the three years is Rs. 65 lakhs. So far, an expenditure of 30.56 lakhs under the various subheads has been approved by the C. P. A. This does not include any provision under minor irrigation or rural arts and crafts; schemes relating to these have been submitted, and are under C. P. A's scrutiny.

The Project Staff are assisted in their work by two Committees. The Project Advisory Committee, a body mainly of non-officials, was constituted on 10th Sept. '52. In consists of 16 members and includes only 2 Officials; the Collector, Trichur who is its Chairman, and the Project Executive Officer, who is its Secretary. A second Committee of District Officials was constituted on 7th May, '53 to coordinate the Project's Programme with the Departmental Programmes.

A. Personnel

The Project Executive Officer was appointed in June 1952. A nucleus Staff consisting of the Assistant Project Officer, Agricultural Officer, Veterinary Officer and a Clerk were appointed in June to initiate the work.

The only additions since 1952 to the cadre of officers have been the three Social Education Organisers, who were recruited in March, 1953 and are under training, and a Co-operative Officer who was appointed in April.

There were originally 20 Gram Sevaks and each was in

charge of a Panchayat area. Four have since left service, leaving only sixteen in the field. The conception of the Gram Sevaks as the generalist who will plan for the village as a whole, and also plan for every farmer, has not been fulfilled. The reasons are threefold. The Gram Sevaks had not sufficient training for the job. They have no compact villages to work in. And finally, against the 500 families which a Gram Sevak has to deal with elsewhere, they have in this Project 3000 – 4000 familes in each Panchayat area. This restricts individual contact and intensive work.

Work in the second and third development blocks is about to begin. Additional staff for this purpose is yet to be recruited.

B. Agriculture and Animal Husbandry

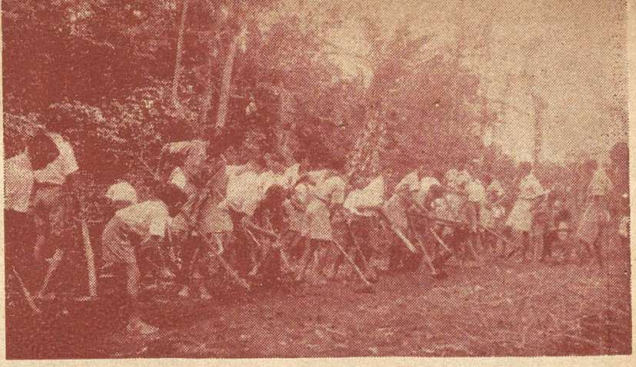
1. *Seed Distribution.* The Project's target is 65000 parahs of quality seeds 1500 parahs of PTB–10 seeds were distributed in the first block for the punja crop. For the current viruppu crop, 500 parahs have been distributed.

The programme of seed multiplication has been beset with difficulties. The first is nonavailability of quality seeds. The original idea was to purchase three parahs from the ryots for every parah of seed sold to them, by giving them a small margin to cover cost of conversion. This requires partial subsidy. But only loan funds are available, for this programme. In the case of PTB-10 seed, which was distributed at Rs. 3–6–0 per parah, Government have allowed an increased price of Rs. 3—10—0. But, owing to the higher price of paddy in the open market, the Project has so far been able to buy back only about 1600 parahs. The success of this programme depends on giving the ryots open market prices for the seed, which is difficult unless grant funds are made available.

2. *Fertiliser.* The Project is now operating as an agent of the Agriculture Department and distributing limited quantities through its Gram Sevaks. Distribution of fertilisers started in January, 1953. The Project has so far distributed 18 tons.

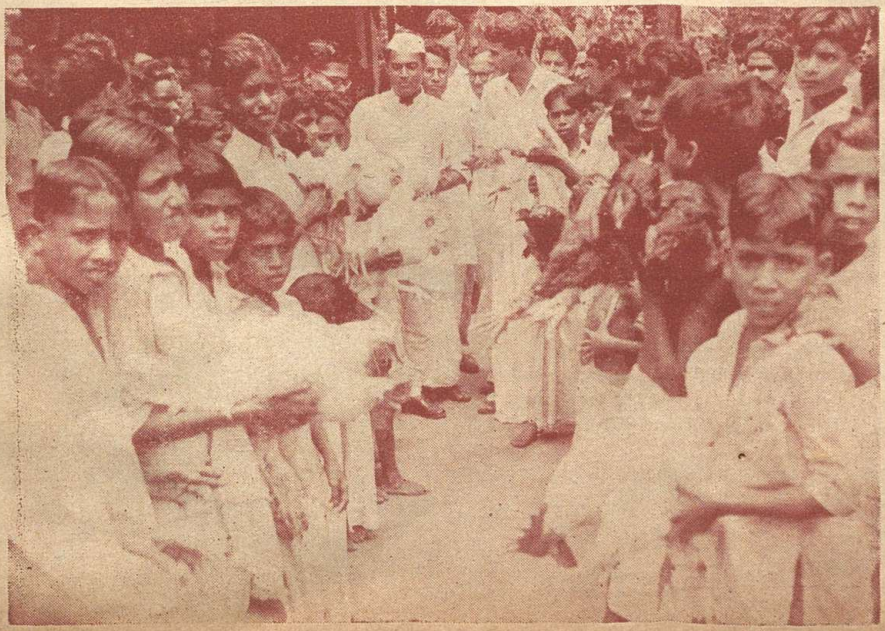
It is also realised that trading in seeds, fertilizer, etc., directly besides being a strain on the administrative machinery, does not help to encourage co-operative effort among the people. Good seeds and fertilizer are in keen demand, if they are made available locally. The Project's present attempt is to create at least one agency in each Pachayat area either the Panchayat itself of a Co-operative Society to take up this job. A survey for this purpose is now in progress. It is also hoped to finance such agencies by issue of short-term loans. Loans totalling Rs. 1.5 lakhs are envisaged. The scheme is now under Government's consideration

Kunnathunad-Chalakudy Community Project



Boy Scouts working at Kanjirapally

Shri S. K. Dey at a bamboo-mat weaver's



Shri S. K. Dey at Melur Poultry Club (see pp. 21—32)

Japanese Method of Rice-Culture —— In Pictures

(1)

(Top)

Paddy seed-beds raised in the Japanese way. The beds are 4′ wide and are raised from ground surface. (Photo taken on 2nd July, 1953.)

(3)

(Right)

Paddy seedlings being transplanted in distinct rows in the prepared field — spacing 12″ between rows and 10″ in the same row, the maximum number of seedlings per point being two. Note the vertical method of planting. A string is being used to guide the workers (Photo taken on 2nd July, 1953)

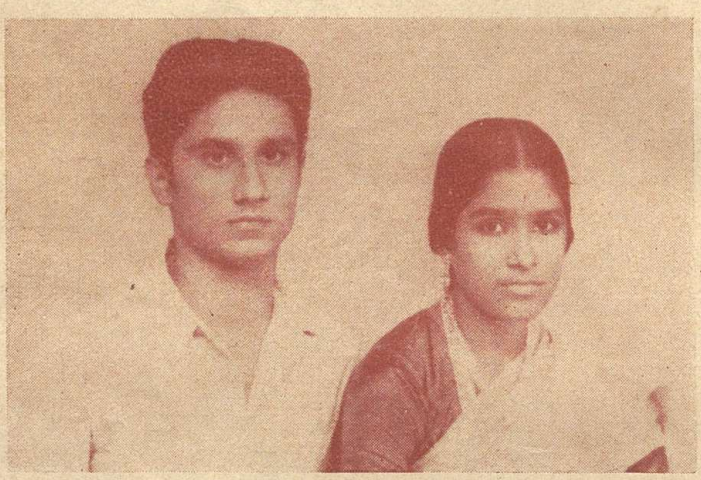
(2)

Well grown paddy seedlings being lifted from the seed-bed. They are pulled up gently and vertically upwards. (Photo taken on 2nd July, 1953)

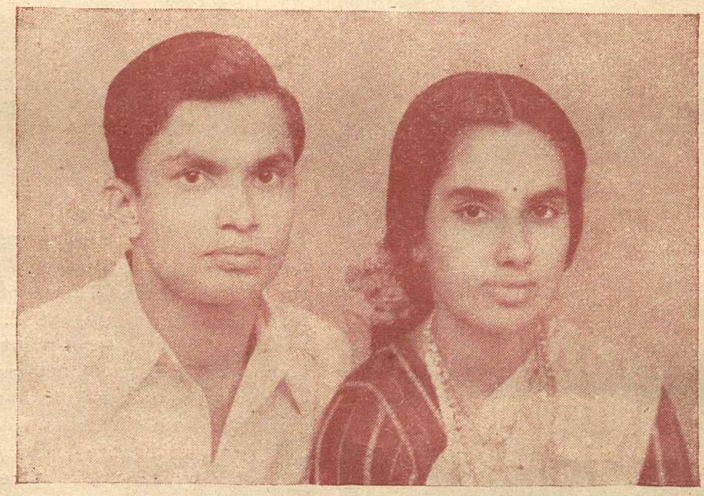
(4)

Balanced NPK fertiliser — mixture being applied as a top-dressing over the young paddy. This photo was taken on 15th July, 1953, only thirteen days after transplantation. Under the stimulus of manures and fertilisers the crop is in a hurry to develop fully with high vigour and the interspaces are being filled up raidly by the development of numerous tillers.

Wedding Bells



Sri M. R. Sankaran L. M. E., Utilities Division, was married to Sow: P. R. Parvathy, daughter of Sri P. P. Rama Iyer, Teacher, Mathur Agraharam on 1st May, '53.



The marriage of Sri K. A. Krishnan B. A., Senior Chemist with Kumari Leelavathy, daughter of Dr. M. G. Nair, Parli was celebrated on 30th May, 1953 at the bride's residence.

Our hearty congratulations and our best wishes to the happy couples !

3. *Pest control.* Equipment for pest control has been purchased, and the programme is under way. So far, only pest control for paddy has been done and 49 acres have been covered, using 7 cwts. (784 lbs.) of gammexane. There has been good response to the pest control programme. It may be noted that insecticides are being sold at 3 annas 6 ps. against the free service rendered by the Agriculture Department. Equipment and service are free. The good response to the Project's programme is attributable to the prompt service given. The best response was in the villages of Annamanada, Kadukutty and Vadama.

4. *Compost pits.* 1378 compost pits have been opened voluntarily in the first block, through the efforts of the Gram Sevaks.

5. The Project has been selected for agronomic trials by the Indian Council of Agricultural Research, and 20 tons of fertilizers have been received. 180 experimental plots are now in the process of selection. On these plots, which will be 5 cents each in area, the ryots are to apply the prescribed fertilizers, which are to be issued free.

6. *Demonstration.* The purpose of demonstration is to educate the ryots in better techniques of cultivation. The farmer has to see to believe. The paddy demonstrations were laid out for the puncha. Two of these failed owing to drought. For these 10 demonstrations, PTB–10 seeds were used. The fertilizers recommended and applied were 2 Cwts. of groundnut cake and 84 lbs. of ammonium sulphate per acre.

For the viruppu paddy crop, 72 demonstrations have been laid. These plots have been partially affected by the lateness of the monsoon. Fertiliser was supplied for basal dressing only in 22 plots owing to technical difficulties. For top dressing supply of fertilizers have been completed.

As part of the demonstration, soils on 75 plots have been analysed. The results of the analysis show that the soils are generally deficient in nitrogen and phosphoric acid.

It is also noteworthy that the use of PTB–10 seed alone on some plots in Kadukutty showed an increase in production of 14%.

Similarly the effects of use of ammonium phosphate was reported from a progressive farmer in Erayankudi. He used 84 lbs. of ammonium phosphate on 1.25 acres. As against the average yield of 100 parahs from the area in normal years, he harvested 126 parahs of paddy in this punja crop. The result is that Erayankudi has developed a taste for ammonium phosphate.

7. The Project has a scheme costing Rs. 10,000/- for increasing the capacity of the Irinjalakuda and Parur Government Cocoanut nurseries. The matter is under Government scrutiny.

8. The Project has also earmarked a sum of Rs. 65,000/- for planting green manure crops on irrigation canal bunds and for plantation of village forests on eroded revenue porambokes. The programme has to be executed by the Forest Department. The scheme is again under Government's consideration.

9. *Agricultural Extension Sub-Headquarters.* There is a provision of Rs. 30,000/- for constructing three Agricultural Extension Centres at Chalakudy, Ankamali and Alwaye. These centres are expected to serve as the focus of Agricultural Extension work in each of the three development blocks, and finally popularise better techniques by demonstrations. The foundation stone for the first centre was laid on 3rd June '53 by Shri S. K. Dey. The designs for the two other centres are ready and work is to start in August – September.

B. Animal Husbandry

1. *Dry Cattle Salvage Farm.* The Project Budget provides for an outlay of Rs. 1 lakh on the Dry Cattle Farm. The purpose of the farm is to collect and maintain good quality cows during their period, service them with good bulls, and return them after calving, to the owners. The site has not yet been handed over. Construction on the Farm can start as soon as the area is made available.

2. *Veterinary hospital and dispensaries.* Owing to adequacy of veterinary aid in the first block, the veterinary hospital, and three dispensaries are to be located in the second and third blocks. The hospital is to be located at Ankamali. There has been an offer of a free site. The three dispensaries are to be at Nayarambalam, Karumalur and Edappally.

3. *Artificial insemination and distribution of stud bulls.* Three Sindhi Stud Bulls and 2 Murrah Buffaloes have been issued in the first block for grading up. The bulls were issued in the last week of January 1953. They have done 72 services till end of May 1953.

Artificial insemination was started on 7th April, '53. Bovine semen is being obtained from the Key Farm at Trichur and collected also from one of the Project's Sindhi Bulls. Insemination is done by the Project's veterinary officer at Panchayat Centres. So far 106 animals were inseminated.

The C. P. A. has now suggested that a Key Village Scheme may be run by the Project, eliminating distribution of Stud bulls. The scheme is now under preparation.

The Project's veterinary officer has during the period attended to five outbreaks of anthrax and inoculated 1100 heads of cattle against anthrax and hemorrhagic septicemia.

Poultry

The Project's idea is only to distribute chicks at a fair price.

An incubator is now under operation and the first hatch is ready. It has now been decided to expand the poultry programme, in view of the keen demand for good birds.

1800 birds have been inoculated against Ranikhet disease during March, April and May.

The Project has also distributed 30 White Leghorn and Rhode Islands cockerels for purpose of grading up.

Poultry and Calf Clubs

Two Poultry Clubs and one Calf Club have been organised among middle school children. In poultry clubs, one pair of birds is issued free to each of the members. The members have the liability to return 20 hatching eggs to the Project. The Project hopes to multiply the clubs with these. The total strength of the club is 40, including 11 girls.

C. Irrigation

The Project has not done any irrigation work so far. The reasons are two: (i) in the first block the scope for irrigation is limited owing to the existence of the Chalakudy River Diversion Project which is nearing completion and (ii) there is no uniformity in the laws applicable to the erstwhile Travancore-Cochin states. The irrigation Act of Travancore has to be made applicable to the Cochin areas as well and the necessary legislative changes are being taken.

Meanwhile a scheme for irrigation costing Rs. 6 lakhs has been submitted. Broadly, the scheme falls into three divisions:-

(a) Distribution of diesel and electric pumps, costing Rs. 2 lakhs. The pumps are to be distributed on hire-purchase terms. Tenders for supply of pumps have been received and are being tabulated.

(b) Lift Irrigation Schemes. There is considerable scope for lift irrigation in the 2nd block.

(c) In the construction of, and repair to, tanks, bunds, weirs, drainage canals, etc., it is hoped to execute selected schemes on a half contribution basis.

The execution of the schemes will start in August – September. The scheme will, it is calculated, benefit a total area of 5300 acres.

D. Reclamation

The provision under this head is Rs. 2 lakhs. The areas suggested for reclamation are the accretion lands at Elankunnapuzha and the shallow backwater areas near Mala and Edavanakad. The technical survey of the schemes has yet to be undertaken.

E. Public Health

(i) *Public Health.* Three new units and the conversion of some existing dispensaries are envisaged. The people of Mattathur and Ankamali have already agreed to make available a free site with a building. The

construction will start as soon as the monsoon is over.

(ii) *Drinking water supply.* The programme is to build 15–20 tube wells on the coastal area. 11 surface wells have already been completed. In these the people's contribution has been nearly 50%.

(iii) *Bathing Ghats.* 3 bathing ghats on the Chalakudy River are nearing completion.

(iv) *Housing.* The scheme is for building cheap houses for fishermen on the coast and the work is to be undertaken after the monsoon.

F. Education

The Project area has about 330 primary schools and 107 high and middle schools. Hence the provision under education is limited. Rs. 15000/- have been allotted to give equipment grants to middle and high schools. A further sum of Rs. 60000/- has been allotted for conversion of 30 primary schools to the basic type. The Director of Public Instruction has already selected ten schools for immediate conversion:–

These schools are to be converted to the basic type in 1953–'54. Twenty more schools will be converted in 1954–55.

Considerable emphasis is being laid on "Craft–Centred" education in these days. A scheme for introducting crafts in the High School curriculam is under consideration.

G. Social Education

1. Rs. 30,000/- are available for recreation centres. The allotment is proposed to be divided between sports clubs, community radio and community parks, in panchayat areas. Two sports clubs have been so far organised.

2. A start has been made in the adult literacy programme. Schools have been opened at Melur, Koratty and Puthenchira. Of these the Puthenchira school is being run by the Gram Sevak. Rs. 15000/- is also available for book-grants to libraries. The details of distribution are under preparation.

It may be stated that though there has been no mass enthusiasm, except in certain panchayat areas, response has been generally encouraging. Local contribution, in money and work, has come. Free surrender of land for all kinds of works is becoming a routine.

There has been a few cases of group work by voluntary workers. At Melur and Karur, school boys built part of the road. In April, a scout camp was held at Kanjirappalli. 60 scouts were present and completed 2 furlong stretch of road. In May six workers of the Kasturba Trust did intensive work in Vijayaraghavapuram. They opened 15 latrines and did some useful health work.

H. Communications

Roads, medical and increased agricultural facilities are

about the three keenest of local demands. Roads are the first demand. The reason is perhaps that in an area where people live in their own homesteads, each man wants an access to his holding by cart. The area has already 225 miles of fair roads.

The selection of roads is made at public meetings, convened at the panchayat centres. The work is awarded to a person nominated by the local panchayat or local public, at ⅔ of the P. W. D. schedule rates without profit, the land for the road is being surrendered free. The statistical details about these roads will be found interesting. At normal P. W. D. rates of work, which includes the compensation for land, contractor's profit, etc., these road works would have cost Rs. 252557/-. But on these works, land valued at Rs. 52310/- has been surrendered free. Rs. 52672/- has been contributed in cash or work. The net cost of 26 miles to the Project is estimated at Rs. 147,575/-. This includes one bridge of 15 feet span, 2 of 12 feet span, one foot-bridge, 34 culverts and 33 ramps.

On roads, local co-operation has been forthcoming in abundant measure. The target on roads is 100 miles.

I. Rural Arts and Crafts

Though no budget allocation has been made under this head, planning is already over. The programme falls into three parts, viz., (a) organization and development of existing industries, (b) introduction of new crafts and (c) training in existing and new crafts.

(a) The estimated cost of developing existing industries is Rs. 8.98 lakhs. The schemes have been prepared in consultation with C. P. A. and the Director of Industries. Their details are indicated below:–

1. *Rural electrification—Rs. 500000/-* At an average cost of Rs. 10,000/- per mile, electrical extensions for 50 miles will be possible.

2. *Handloom–Rs. 213,000/-* It has been stated that the difficulties which the handloom weaver faces are non-availability of yarn, lack of standardisation and shrinking markets. The yarn position is now easier. Standardisation has to be undertaken by the Central Societies. With regard to markets, it has been recommended that if the handloom cloth can be marketed in a more attractive form sales would improve. Hence the installation of a complete unit for calendering, bleaching, printing and dyeing is proposed.

3. *Lemon-grass distillation–Rs. 50,000/-* Lemon-grass oil is one of the State's chief dollar earners. There are 8500 acres under lemon-grass in the Project area. The oil is now being hydro–distilled. It has been found that steam–distillation will increase oil production by 20% by elimi-

nating waste. The programme has two aspects. The first is starting a demonstration centre (at a cost of Rs. 25000/-) in the lemon-grass area with a steam-distillation unit. The second is to locate three steam-distillation units in the Project area.

4. *Pot-making.* It is intended to start three units where there are sufficiency of potters and provide them with (i) land for clay-mining and (ii) pug-mills and kilns.

5. *Screwpine mats-Rs. 5000/-* This industry is confined to Eriyad-Edavilangu areas. The money provided is for loans to co-operative units for the marketing of mats.

6. *Bamboo-mats and basket making-Rs. 60,000/-* This is one of the main cottage industries of the area. The programme is intended to enable co-operative units to collect and distribute bamboo-reeds at fair rates. A lorry is also to be provided for easy transport of reeds from the hills.

7. *Bee-keeping – Rs. 20000/-* The programme is to distribute 1700 bee-hives in the Project area at fair rates.

8. *Oil-crushing-Rs. 30,000/-* The amount provided for is to distribute 60 Wardha type ghanis and to employ an organiser and carpenter to maintain the ghanis.

It may be noted that in formulating the above programmes, fishing has not been included.

Along with the two programmes indicated above the Project has schemes for starting one or two trade schools in the area.

Conclusion

The problems are many, and they do not admit of easy solutions. The remedy, as has been often said, is in the co-operative effort of the people to achieve good objectives. If the Projects enthuse in people the will to better standards, and help in giving them the tools and the technical advice, they will have succeeded. Will they? Time alone has the answer.

(See photos printed elsewhere)

. . . . . and then some!

Most often the margin that divides success from failure is as narrow as a knife - edge. A few minutes of extra work when the body is already tired beyond endurance and the brain crier out, "It is useless" may result in victory.

Your Queries Answered

(In this Section answers are given by our Agricultural Chemist to questions received from the public on Soil, Agriculture and use of Fertilisers.)

Question No. 107

In the previous issue of your journal you have said that it is a good practice to mix superphosphate with compost or yard manure. Should the mixing be done in the manure-pit itself, or can it be done later, prior to the incorporation of the manure in the soil?

Answer

It is much more preferable to mix the superphosphate in the manure-pit itself, that is, when the manure is actually being built up in layers in the pit. Mixing the phosphate later, just prior to the application in the land will not be so effective for the following reasons. If the phosphate is dusted over the successive layers of the manure, it will gradually enter into the composition of the manure. The phosphate will stimulate bacterial activity. The decomposition of the manure and the resultant production of humus will be hastened. The phosphate also helps in the preservation and protection of the nitrogen-content in the manure.

If, on the other hand the phosphate is added later, it has no time to perform these functions. The product will be just a physical mixture of the two materials. It is true that once the mixture is incorporated into the soil, the phosphate will interact with humus and bacterial action will proceed. Yet valuable time has been lost. Therefore, it can be stated definitely that adding phosphate to the finished manure can only be considered as a second alternative to the other more effective way of applying it in the manure-pit itself.

Question No. 108

I have a few fruit trees in my home garden. Lately I notice that large numbers of young fruits fall off from the trees. May I know what this is due to and how it can be rectified?

Answer

What you have described is a case of premature shedding. This symptom may be due to

different causes. For instant the soil may be waterlogged, in which case young fruits will fall prematurely. Or it may be due to severe drought. But even in soil supplied with optimum moisture —conditions premature shedding will occur, in which case it is definitely due to soil deficiencies. A liberal manuring scheme will automatically end this trouble. To correct all the deficiencies it will be preferable to use a well-balanced fertiliser mixture, with high phosphate value. Two applications of such a mixture will put a stop to the shedding of unripe fruits. Before actually applying the mixture it will be better to test the soil reaction also. If the soil is acid it has to be neutralised with lime or chalk.

In the case of trees like cocoanut and arecanut, premature shedding may be caused by a fungus disease, which goes by the name of 'Mahali disease'. This ailment can be suppressed by spraying the crowns of the trees with Bordeaux mixture. In agriculturally advanced countries spectacular results in preventing fruit-drop has been obtained by the use of sprays containing certain synthetic growth regulating materials.

Question No. 109

For the last two or three seasons my paddy crop has been consistently failing, particularly in small patches. The crop becomes discoloured with yellow and brown markings on the leaves. May I know what these symptoms stand for and how these can be stopped?

Answer

The failure of the crop in patches and the discolouration of the leaves are the symptoms of soil acidity or sourness. Soil acidity is synonymous with deficiency of lime, since the latter is the only predominant base that can promptly check any development of sourness in the soil. When the lime is leached out and not replenished then the soil becomes sour and as a result fertility level goes down. Phosphate and other important plant foods become unavailable to the plant. The development of acidity is generally not uniform throughout the land and it takes place rapidly in some isolated spots where due to the extreme degree of sourness the young crop after a brave start just withers out. That is why you see the crop failing in patches The discolouration of the leaves is caused by the unavailability of important plant foods like phosphate, lime, etc.

To rectify these defects you should first add chalk (calcium carbonate) to the soil. A heavy dressing of not less than 3 tons of chalk per acre may be used. Spread the chalk powder on the surface of the land and work it in by a few ploughings. The actual quantity of chalk needed by a soil for raising the reaction to the level of neutrality (pH 7) can be estimated by analytical methods.

The addition of chalk will bring normal health to the soil by neutralising its reaction. But

please don't expect spectacular effects as soon as you have applied the chalk. It will take some time, a few months, before the chalk has effectively disposed off the sourness. Sufficiency of lime is a sine qua non for high productivity of a farm soil.

Question No. 110

I have a small orchard in which I have planted fruit trees like mango, guava, etc. A large portion of the fruits are found damaged by some insects. The fruits are marked with brown spots and they get spongy and fall off prematurely. Please tell me what this is due to and how I can prevent this?

Answer

From the symptoms detailed by you, I can state that the damage is caused by the mango fruit fly, which goes by the imposing name of *Dacus ferrugineus Fabricius*. This fly is one of the strongest enemies of the fruit trees. It has been recorded in several states like Madras, M. P., Bihar, Punjab and U. P. This insect attacks not only mango but also other fruits such as guava, apple, plum, peach, etc.

A study of the life history of this insect will greatly help you in controlling it. The female fly makes a puncture on the fruit and inserts shiny, white, elongated eggs, about 2 to 11 in number, under the skin of the fruit. The fly may make sometimes more than a dozen punctures on one fruit. After a few days a white maggot comes out of the egg and starts to penetrate into the interior of the fruit. It shows great perseverance and it eats its way through the fruit. When it is fully grown the maggot finds a suitable spot in the soil around the tree for its pupation. The pupae are generally found about 3" to 6" deep in the soil. After a varying period of pupation, which depends on the climate, (6 days in summer and more than 40 in winter) the adult fly emerges from the pupa. The adult lives for a month and it starts egg-laying. Thus the life cycle goes on. The adult flies have a habit of swarming under the fruit plants.

The attacked fruits get spongy and the pulp begins to ferment and decompose as soon as the maggots start feeding on it. We can see dark-brownish, circular markings on the fruit around each puncture. A syrupy fluid will be oozing out from the point of puncture. The fruit finally rots and falls off prematurely. One or two holes also can be seen on the fruit and these represent the exits of the maggots when they ultimately left the fruit for their pupation in the soil.

The following control measures can be taken up to put an end to the devastation caused by this tiny insect.

The infested fruit is always a source of further infection and as such it has to be destroyed effectively. Such damaged fruits

should be buried in a deep pit two feet below the surface and the earth above the pit must be well rammed; otherwise the insect will escape. If such pitting is not practicable the attacked fruits must be boiled for an hour to kill the maggots. All fallen fruits must be collected in time and destroyed. The weedy growths around the trees must be periodically cleaned up, as they tend to hide the fallen fruits. Fruit picking must be thorough and not a single one should be overlooked. Proper sanitation of the orchard is very important. Since the adult flies have a tendency to swarm under the leaves of the fruit trees, we can take advantage of this habit and spray the trees with diesel oil soap-emulsion made according to the following formula:

Diesel Oil — 1 gallon.
Soft Soap — 1 lb.
Water — 1 gallon.

This is the stock solution, which can be diluted eight times with water before actual use.

It is reported that some chemicals like liquor ammonia, citronella oil, etc. have the power to attract the adult flies and so they can be used in traps to kill them. The mixture containing 8 oz. of bran, 8 oz. of borax and 1 gallon of water is a convenient bait. The importance of interculturing and keeping the orchard clean has to be stressed once again for it greatly helps in the eradication of the damage by this insect enemy.

Born out of necessity!

The three foods that a plant needs most are nitrogen, phosphorus and potash. Without these our gardens and fields would be deserts, and we should starve. Formerly farmers got enough of these materials from the old fashioned manures, but during the past 150 years the population of the world was more than trebled. In 1780 the people of this planet numbered only a little over 600 millions; but now it is reckoned that there are nearly 2000 millions—and if Science had not stepped in to aid the farmer with the discovery of fertilisers, these multitudes would not have enough to eat. Can any one deny this?

News Reel

New Steel Plant for India

A German Combine of two machine firms Demag and Krupp is to help build a new steel plant in India under an agreement signed between the Combine and the Indian Government.

The plant which is to occupy a "central place" in India's Five-Year Plan will have an initial capacity of half a million tons later to be expanded to one million.

Mr. Chanda added that India had "great faith in German efficiency and skill" and hoped the agreement would be the "forerunner of similar association between the two countries in other fields of industrial development."

This was the first Indo-German Project of the kind since the war.

The agreement which provides for both financial and technical participation in the plant by the German Combine was signed on the German side by Dr. Thun and Herr Schueller from Demag and Herr Schroder and Scyboth from Krupp.

Present at the signing were the Indian Ambassador in Bonn, Mr. Subimal Dutt and Herr Scharpenberg of the West German Foreign Office.

The estimated capital cost of the new project is 150 million dollars with a German participation of upto 20 million dollars. India is to be the main participant, but once a company has been formed, the International Bank of Reconstruction and Commerce will be asked to co-operate in the project.

The plant was expected to go into production within four years.

A representative of the German Combine said the West German Government had promised it "all the necessary facilities" to carry out its undertakings under the agreement.

Representatives of the Combine were expected to visit India next month to decide with Indian experts on a suitable site for the plant.

Rice Growing by Japanese Method

Nearly two-thirds of India's annual rice deficit is expected to be made up by additional production of the cereal by the Japanese method of cultivation which was launched on a nation wide scale on March 15. The saving in foreign exchange through the larger yield of rice is estimated to be in the neighbourhood of Rs. 34 crores.

The new method has been introduced in about 23,000 village areas, spread out in 26 of the 28 states. By the end of this year, it is expected that the Japanese technique will have been extended to 2,00,000 more villages and 6,00,000 acres of paddy land brought under the plough.

Nearly 7,00,000 pamphlets in 13 languages, 500 film strips and innumerable demonstrations and talks have taken the new knowledge to the farmers. Teachers, students, co-operative societies, besides Government personnel, have helped in spreading the use of the new method.

The use of fertiliser, which forms an important part of the Japanese system of cultivation, has been extensively resorted to, and the initial campaign is likely to involve the use of nearly 3.00,000 tons of ammonium sulphate.

It is stated that even if only *three per cent* of India's paddy growing areas is cultivated by the Japanese method the rice deficit will be wiped out.

Mining of Lignite

Indications are available that lignite deposits in Neiveli in South Arcot district can be struck by about January next, if the present programme of work is put through.

A meeting of the High Power Committee on lignite project was held at Neiveli.

Dr. U. Krishna Rao, Minister for Industries, Mr. J. M. Lobo Prabhu, I. C. S., Development Secretary, Mr. N. Padmanabha Aiyar, Chief Engineer (Irrigation), Dr. Guha, Chairman of the Coal Board, Dr. Paul Eyrich, American mining expert, Mr. Narayana Rao, Superintending Engineer (Electricity) and Dr. Dey, Superintendent, Geological Survey of India, attended the meeting.

Members of the Committee inspected the quarry and, it was officially stated, were satisfied that the actual conditions were better than what had been anticipated from the trial borings. They found that the problem of water was resolving itself probably because the exposure of a large surface to the sun had dried the water springs.

Dr. Guha apprised the members of the committee of the existence of a similar phenomenon in Germany where even near the Rhine there was no evidence of water seepage, with the large open surface creating a kind of heat barrier. This feature had heartened the members of the Committee particularly as it was considered that not only would the cost of excavation be reduced but it would be possible to have "steeper slopes and expose a larger surface of lignite."

If conditions in respect of water continue to be the same, it is expected by official sources that as much as 80,000 tons of lignite can be extracted from this pilot project which is four times the quantity previously estimated.

The Committee expressed its gratefulness to the T.C.A. (American Aid) for making available their valuable supplements to the existing machines which would enable the work to be proceeded with. The Committee requested that equipment costing 2,50,000 dollars be made available by the TCA as soon as possible.

As regards the method of work adopted at Neiveli, the Committee fully approved of what had been done. Under very difficult circumstances, more than one-sixth of the total over burden (earth) had been removed. In the next six months, the Committee expected that, given necessary equipment, the staff would be able to remove 75,000 cubic yards of earth, if some incentive like a bonus of a month's pay was offered for reaching the target fixed. If this was put through, it is expected that the lignite deposits could be struck within a further period of three months, say by about January, 1954.

Dr. Eyrich brought to the notice of the Committee that the Madras Government might be able to obtain Rs. 25 lakhs from the Government of India as provision for this had already been made in the Indo-U. S. Agreement as a counter-part expenditure given by the TCA.

The Committee felt that the results of the excavation justified the building programme for the staff at an estimated cost of Rs. 11 lakhs.

It was officially stated that the Committee was generally satisfied with the progress so far made and about the prospects in the future. In this connection, Dr. Guha, who had recently been to Germany to visit lignite mines, is reported to have stated that 83.4 million tons were obtained with open cut mining in Germany with the employment of only 7,700 men at a cost varying between Rs. 4 and Rs. 6 a ton. Although the Germans had the advantage of higher mechanisation, he thought that this country possessed the advantage of having lignite at a depth which was about three times less than in the German mines.

It might be mentioned that in Madras State, rail-borne coal costs Rs. 35 a ton while sea-borne coal costs Rs. 65. This will indicate the great advantage which the Madras Industries may derive if lignite can be obtained at a cost which is in any way comparable to that of German coal.

Potatoes

While rich in starch, the potato contains many essential minerals and vitamins.

If properly cooked, a medium-sized potato can give you 118 calories of food energy, as much calcium as contained in one and a half table spoons of cream cheese, as much phosphorus as to be found in a thick slice of whole wheat bread, almost as much iron as in a normal serving of a meat

dish, as much of the B Vitamins as in a cup of meat stew, as much vitamin C as in a small orange.

The art of cooking potatoes is to cook them long enough to rupture the starch granules but not long enough to destroy their food value. Boiled whole in its skin, the potato retains practically all of its vitamin C and a high degree of the other nutrients. If cut and then boiled, it loses its food value by 30 per cent. Some nutrients are retained in the cooking water, which should always be used. For cooking, the smallest quantity of water, just enough to cover the potatoes, should be used. It should be boiling when the potatoes are added.

Never salt potatoes while they are cooking. Keeping boiled potatoes over-night destroys their utility as a protective food. Cooking, but not over-cooking potatoes in a steam-cooker retains the nutrients. It is better to mash them just before eating provided these have already been boiled whole in their skins.

Baking potatoes whole in their skins is, in general, a good method of conserving nutrients, but not as good nutritionally as boiling them whole in their skins. Frying pre-boiled potatoes results in a marked loss of both vitamin C and B_1. Raw potatoes, when fried, retain about 60 per cent of their vitamin C, but lose heavily in vitamin B_1.

Safety Bulletin—4

CLEANING MACHINERY AND ELECTRIC MOTORS

Hazards

The principal hazards encountered in the cleaning of machinery and electrical equipment are:—

a) The operator may be burned from contact with steam or hot water, or by the steam hose and pipe.

b) Foreign bodies may be blown into the eyes or against other parts of the body when the air hose is used under high pressure. The operator may be injured if the air hose whips and strikes him, and other employees may be injured by flying particles.

c) Direct contact with or splashes from strong alkali solutions will cause chemical burns, especially to the eyes.

d) The use of many common solvents, both inflammable and non-inflammable, causes a toxic hazard that involves the respiratory system and may affect other parts of the body.

e) Dermatitis or skin irritation may be caused by contact with solvents and chemicals used for cleaning.

f) An explosion hazard may accompany the use of inflammable solvents.

g) Fire is a common hazard when either high flash point or low flash point petroleum solvents are used.

(To be continued)

(Issued by the Safety Dept., FACT Ltd.)

ജപ്പാനിലെ നെൽകൃഷി സമ്പ്രദായത്തിന്റെ മൌലിക പ്രമാണങ്ങൾ

ജപ്പാനിലെ നെൽകൃഷിയെപറ്റി ഒരു ദീർഘ ലേഖനം എഴുതുകയല്ല ഇവിടെ ഞങ്ങളുടെ ഉദ്ദേശം. പ്രതൃത, വായിക്കുന്നവരുടെ മനസ്സിൽ വിവരങ്ങൾ ശുദ്ധ മൂലമായി പതിയത്തക്കവണ്ണം, ഈ കൃഷി സമ്പ്രദായത്തിന്റെ ചില പ്രത്യേക സ്വഭാവങ്ങളുടെ ഒരു പട്ടിക കുറിക്കണമെന്നേ ഞങ്ങൾ വിചാരിക്കുന്നുള്ളൂ.

ഞാറടികളുടെ ഒരുക്കൽ.

(1) കൊയ്ത്തു കഴിഞ്ഞാൽ ഉടൻതന്നെ നിലം ഉഴുതു മറിക്കണം. മണ്ണിന്റെ ഈർപ്പം സംരക്ഷിക്കുവാനും കള, പൂച്ചികൾ ഇവയെ അമർത്തുവാനും ഇതു വളരെ സഹായിക്കുന്നു.

(2) ഞാറുനടം പ്രത്യേകം തിരിച്ചെടുത്തു് അനവധി പ്രാവശ്യം ഉഴുതു മറിച്ചു്, കട്ടയെല്ലാം ഉടച്ചു് മണ്ണിന്റെ മാർദ്ദവം പരമാവധി വർദ്ധിപ്പിക്കണം.

(3) 4 അടി വീതി, 3 ഇഞ്ചു് കിളരം, സൌകര്യപ്രദമായ നീളം ഈ അളവിൽ പല വാരങ്ങൾ ഒരുക്കി എടുക്കുക.

(4) രണ്ടു വാരങ്ങൾ തമ്മിൽ ഒരടി അകലം ഉണ്ടായിരിക്കണം. കള പറിക്കാനും വളം ഇടാനുമൊക്കെ ഇതു കൂടുതൽ സൌകര്യപ്രദമായിരിക്കും. അതുമല്ല, ഈ താഴ്ന്ന ചാലിൽകൂടി അധികമുള്ള വെള്ളം ഒഴുകിപ്പോകയും ചെയ്യും.

(5) 25 അടി നീളമുള്ള ഒരു വാരത്തിന്, ഒരു മന്നു് കമ്പോസ്റ്റു് വളമൊ അല്ലെങ്കിൽ അതുയും കുണ്ടു വളമൊ ചേക്കണം. അതു കൂടാതെ രണ്ടു റാത്തൽ കൂട്ടുവളം (അമോണിയം സൾഫേറും സൂപ്പർഫോസ്ഫേറും ശരിക്കുശരി കൂട്ടിയതു) കൂടി വിതറിയിട്ടു്, മുകളിൽ മണ്ണിട്ടു മൂടുക.

(6) അരിച്ചെടുത്തു് കൂട്ടിയിളക്കിയ കമ്പോസ്റ്റും ചാരവും കൂടി അരയ്ക്കാലിഞ്ചു ഘനത്തിൽ നിലത്തിന്റെ മുകളിൽ വിതറുകകൂടി ചെയ്താൽ ഞാറുനടത്തിന്റെ ഒരുക്കം പൂർത്തിയായി.

വിത്തിന്റെ തെരഞ്ഞെടുപ്പു്.

(1) ഏറ്റവും നല്ല ഇനത്തിലുള്ള വിത്തുകളെ സ്വീകരിക്കാവു. ഗുണപൂർണ്ണതയെപറ്റി തീച്ചയില്ലാത്ത വിത്തുകൊണ്ടു് ഒരിക്കലും തൃപ്തിപ്പെടരുതു്.

(2) വിത്തു് ശരിയായി പതിരു കളഞ്ഞു് വൃത്തിയാക്കിയതും നല്ല ഉണക്കുള്ളതുമായിരിക്കണം.

(3) ഒരു തൊട്ടി വെള്ളത്തിൽ അര റാത്തൽ ഉപ്പു കലക്കി, വിത്തു് അതിലിടണം. മുകളിൽ പൊങ്ങിക്കിടക്കുന്നു പതിരെല്ലാം ഉപേക്ഷിക്കണം.

(4) അതിന്റെ ശേഷം വിത്തു് ശുദ്ധജലത്തിൽ കഴുകി ഉപ്പിന്റെ അംശം മുഴുവൻ കളയണം.

(5) ഒന്നര റാത്തൽ പെറനോക്സ് ദ്രാവകവും (Perenox) 50 ഗ്യാലൻ വെള്ളവും ചേർത്തു് ഒരു ലായനിയുണ്ടാക്കി അതിൽ വിത്തിട്ടു് പതിനഞ്ചൊ മുപ്പതൊ മിനിട്ടു സൂക്ഷിക്കണം. ഇപ്രകാരം ചെയ്യുമ്പോൾ രോഗാണുക്കളെല്ലാം നശിക്കുന്നു.

വിതയ്ക്കൽ.

(1) വിത്തു് കുറച്ചു മാത്രം ഉപയോഗിക്കുക. അഞ്ചു സെൻറ് സ്ഥലത്തു പാകികിളുപ്പിക്കുന്ന പതിനെട്ടൊ ഇരുപതൊ റാത്തൽ വിത്തുകൊണ്ടു് ഒരേക്കർ സ്ഥലം കൃഷിചെയ്യാം.

(2) കുറെശ്ശെയായി നേർവരിയിൽ വിത്തു പാകുക. അധികം വിത്തു് ഉപ

യോഗിച്ചാൽ ഞാറ് തിങ്ങി വളരുകയും തൽഫലമായി അവ പുഷ്ടി കുറഞ്ഞ് ക്ഷീണിച്ചുപോകയും ചെയ്യും. കുറേശ്ശെ വിതക്കുന്നുവെങ്കിൽ നല്ല പുഷ്ടിയും ശക്തിയുമുള്ള ഞാറ് ലഭിക്കും. ജപ്പാനിലെ കൃഷികൻ സാധാരണ 5 സെൻറ് ഞാറടികളിൽ അഞ്ചോ ആറോ റാത്തൽ വിത്തു മാത്രമെ ഉപയോഗിക്കുന്നുള്ളു. ഒരേക്കർ സ്ഥലത്തേയ്ക്ക് ആ ഞാറ് മതിയാകും. എന്നാൽ അതേസമയം നമ്മുടെ കൃഷിക്കാർ ഏക്കറിന് 80 മുതൽ 120 വരെ റാത്തൽ വിത്തുപയോഗിക്കുന്നു.

(3) സൂക്ഷ്മതയോടെ പ്രവർത്തിച്ചാൽ ഒരേക്കർ സ്ഥലത്തേയ്ക്കാവശ്യമായ ഞാറ്, പത്തോ പതിനഞ്ചോ റാത്തൽ വിത്തുകൊണ്ട്, അഞ്ചോ ആറോ സെൻറ് സ്ഥലത്ത് മുളപ്പിക്കാവുന്നതാണ്.

(4) വിതച്ചശേഷം കുറേശ്ശെ മണ്ണ വിതറി വിത്തു മൂടണം. അതിനുശേഷം പലകയൊ കൈപ്പത്തിയൊ ഉപയോഗിച്ച് ആ മേൽമണ്ണ് അമർത്തിയിട്ടേക്കുക.

ഞാറടികളുടെ ശുശ്രൂഷണം.

(1) മഴയില്ലെങ്കിൽ വിത്തുതറ നാം തന്നെ നനയ്ക്കണം. തോട്ടത്തിൽ വെള്ളമൊഴിക്കുന്ന തൊട്ടികൾ (Rose can) ഇതിനുപയോഗിക്കാം. എപ്പോഴും തറയിൽ ആവശ്യത്തിനുള്ള നനവുണ്ടായിരിക്കണം.

(2) വേണ്ടത്ര വളമുള്ളതുകൊണ്ട് ഞാറ് വേഗം വളരും. ദിവസേന ഞാറടികൾ പരിശോധിക്കണം.

(3) ഞാറുതടങ്ങളിൽ കള വളരുവാൻ അശേഷം സമ്മതിക്കരുത്. വിതയ്ക്കുമുമ്പ് നിലം ശരിയായി ഒരുക്കിയിട്ടുണ്ടെങ്കിൽ കളയുടെ ഉപദ്രവം തീരെ കുറവായിരിക്കും. കള പറിക്കുമ്പോൾ ഞാറിന് ദോഷം തട്ടാതെ സൂക്ഷിക്കണം.

(4) ഞാറ് നട്ടിട്ടുള്ള വാരങ്ങളിൽ ചവിട്ടുകയൊ, കൈകൊണ്ട് വളരെ അമർത്തുകയൊ ചെയ്യരുത്. തറ ഉറച്ചുപോയാൽ ഞാറ് പറിക്കുമ്പോൾ വേരുകൾ പൊട്ടുകയും കേടുപറ്റുകയും ചെയ്യാനിടയുണ്ട്.

(5) വാരങ്ങളുടെ രണ്ടു വശത്തുനിന്നുമായിരിയ്ക്കണം കള പറിച്ചു മാറ്റുവാൻ.

(6) കള നിശ്ശേഷം പറിച്ചുമാറ്റിയതിനുശേഷം മുമ്പുപയോഗിച്ച ക്രമത്തിനുള്ള കൂട്ടുവളം ഒരിക്കൽകൂടി പ്രയോഗിക്കണം.

(7) ഈ കൂട്ടുവളം, ലോലമായി വിതറിയാൽ രൈകൾക്ക് ഉപദ്രവം ഉണ്ടാകയില്ലെന്നു മാത്രമല്ല, അതിവേഗത്തിൽ ഫലം കണ്ടറിയുവാനും സാധിക്കും.

(8) വേണ്ടവിധം ഞാറ് വളരുന്നില്ലെന്ന് നിങ്ങൾക്കു തോന്നുന്നപക്ഷം ഒരു പ്രാവശ്യംകൂടി കൂട്ടുവളം ചേർക്കാം.

(9) 8 ഇഞ്ചു പൊക്കത്തിൽ വളരുകയും, 6-ാമത്തെ ഇല വിടരുകയും ചെയ്യുമ്പോൾ ഞാറ് പറിച്ചുനടാവുന്നതാണ്.

തൈ പറിയ്ക്കൽ.

(1) ഞാറ് ഇളക്കുമ്പോൾ ഒടിഞ്ഞും ഉപയോഗശൂന്യമായി പോകാതെ പ്രത്യേകം സൂക്ഷിക്കണം.

(2) വളരെ സൂക്ഷ്മതയോടും മൃദുലമായും ഞാറിളക്കണം. വേരിന് ഒരു വിധത്തിലും കേടു വരരുത്.

(3) ഞാറിളക്കുന്നതിനു മുമ്പ് മുപ്പല്ലി (Fork) കൊണ്ട് നിലം ഇളക്കുന്നതും നന്നായിരിക്കും.

(4) ഞാറ് ഓരോന്നുവീതം പറിച്ചെടുക്കുന്നതാണ് ഉത്തമം. രണ്ടു വിരലുകൾക്കിടയിൽ പിടിച്ചു, നേരെ മേല്പോട്ടു വലിച്ചു സാവധാനത്തിൽ ഇളക്കണം.

(5) പറിച്ചെടുത്ത ഞാറ് വെള്ളത്തിൽ സൂക്ഷ്മതയോടെ കഴുകിയെടുക്കണം. കഴുകുമ്പോൾ ഞാറ് ഉലയരുത്. ഉലച്ചിൽ വെരുപൊടികളെ ഒഴുക്കുലപ്പെടുത്തിയേക്കും.

(6) പറിച്ചെടുത്ത ഞാറ് ചെറിയ ചെറിയ കെട്ടുകളായി കെട്ടിവയ്ക്കണം. വള്ളികൊണ്ടോ, നമ്മുടെ നാട്ടിൽ ചെയ്യുന്നതുപോലെ ഞാറിലകൊണ്ടുതന്നെയൊ ഇവ കെട്ടാവുന്നതാണ്.

നിലം ഒരുക്കൽ.

(1) ജപ്പാനിലെ കർഷകൻ എപ്പോഴും കൊയ്ത്തു കഴിഞ്ഞാൽ ഉടൻതന്നെ നിലം ഉഴുതിടുന്നു.

(2) നിലത്തിൽ പച്ചിലച്ചെടികൾ വളർത്തി, അവ പുഷ്പിക്കുന്ന കാലമാകുമ്പോൾ വെട്ടിയിട്ട് ആ നിലത്തിൽതന്നെ ഉഴുതുചേർക്കുന്നതു് ഉത്തമമായിരിക്കും. നമ്മുടെ നിലങ്ങളിൽ സൺഹെമ്പ് (Sun Hemp), കോലിഞ്ചി (Kolinji), ഡെയിൻച്ചാ (Daincha) മുതലായ പച്ചിലച്ചെടികൾ സമൃദ്ധിയായി വളർത്താവുന്നതാണ്.

(3) മൂന്നാലു പ്രാവശ്യം ഉഴുതതിനു ശേഷം പതിനഞ്ചൊ ഇരുപതൊ വണ്ടി കണ്ടുവളമോ കമ്പോസ്റ്റോ ചേർക്കണം.

(4) നിലം എത്രത്തോളം കൂടുതൽ ഉഴുതിടുന്നുവൊ, അത്രയും കൂടുതൽ ഫലമുണ്ടാകുന്നു. കുറഞ്ഞതു് പത്തു പ്രാവശ്യമെങ്കിലും ഉഴവു നടത്തണം. വെള്ളം വേണ്ടത്ര കയറിയിട്ട് ഉഴവു നടത്തിയാൽ, മണ്ണിനു് നല്ല മർദ്ദനമേറുകയും അതിന്റെ മേനി വർദ്ധിക്കും.

(5) പൂട്ടി അടിയ്ക്കുന്ന സമയത്തു് അമോണിയം സൾഫേറും സൂപ്പർഫോസ്ഫേറും, തുല്യ അളവിൽ ചേർത്തുണ്ടാക്കിയ കൂട്ടുവളം ഏക്കറിനു് 200 റാത്തൽ വീതം ചേർക്കണം.

(6) വരമ്പു് ശരിയായി വെട്ടി ഒരുക്കുവാൻ ശ്രദ്ധിക്കണം. പാഴ്ചെടികളും വെട്ടിക്കളഞ്ഞു്, എലിയുടേയും ഞെണ്ടിന്റേയും മാളങ്ങളും അടച്ചു ഭദ്രമാക്കണം. ഒരു നിലത്തിൽനിന്നും മറ്റൊരു നിലത്തിലേക്കു് വെള്ളം ഒലിച്ചുപോകാനുള്ള സാദ്ധ്യത ഇതിനാൽ വളരെ കുറയും.

നടീലിൽ.

(1) ജപ്പാൻ കർഷകൻ എപ്പോഴും ഞാറ് വരിവരിയായി നടുന്നതിൽ വളരെ ശ്രദ്ധാലുവാണു്. വരികളുടെ ഇടയ്ക്കു് വേണ്ടത്ര സ്ഥലമിടുന്നതിൽ അയാൾ പ്രത്യേകം നിഷ്കർഷിക്കുന്നു.

(2) നമ്മുടെ നാട്ടിൽ ചെയ്യുവരുന്നതുപോലെ ഓരോ പിടി ഞാറ് നട്ടുന്ന സമ്പ്രദായം അത്ര ആശാസ്യമല്ല.

(3) ഒരു കുഴിയിൽ രണ്ടോ മൂന്നോ തൈകളിൽ കൂടുതൽ ഉണ്ടാകാൻ പാടില്ല.

(4) നിഷ്കർഷയോടുകൂടി വളം ചെയ്തു് ഒരുക്കിയെടുത്ത നിലവും, ശ്രദ്ധയോടെ മുളപ്പിച്ചെടുത്ത ഞാറുകളുമാണെങ്കിൽ, ഒരു കുഴിയിൽ ഒറ്റ നെൽചെടി മാത്രം നട്ടാൽ മതിയാകും.

(5) നേർവരിയിൽ നെൽചെടി നടുന്നതിനു്, പ്രത്യേകം അടയാളപ്പെടുത്തിയ ഒരു കയർക്കുടി ഉപയോഗിക്കാവുന്നതാണ്.

(6) എപ്പോഴും ഞാറ് കുത്തനെതന്നെ (Vertical) നടണം. ചായിച്ചു നട്ടാൽ, വേരുറച്ചു് വളർച്ച തുടങ്ങുവാൻ ഒരാഴ്ച പിടിക്കും. ചെടി, നേർക്കു നട്ടാൽ, ഈ സമയനഷ്ടം കൂടാതെ കഴിക്കാം.

(7) രണ്ടു വരികളും തമ്മിലും, ഒരു വരിയിലുള്ള രണ്ടു കുഴികളും തമ്മിലും കുറഞ്ഞതു് പത്തിഞ്ചു് അകലമുണ്ടായിരിക്കണം. നിലം ശരിയായി വളമിട്ട് ഒരുക്കിയിട്ടുള്ളതാണെങ്കിൽ, ഒരടിയൊ അതിലധികമൊ അകലം വരുത്താം.

(8) ചെടികളും തമ്മിൽ വേണ്ടത്ര അകലമുണ്ടെങ്കിലെ പൂർണ്ണഫലം ഉണ്ടാകയുള്ളു. കൂടുതൽ ഞാറു നട്ടാൽ കൂടുതൽ വിളവുണ്ടാകുമെന്നുള്ള ധാരണ വളരെ തെറ്റാണു്.

(9) നടുമ്പോൾ, ചെടി രണ്ടു വിരലുകൾക്കിടയിൽ പിടിച്ചുകൊണ്ടു്, മറ്റൊരു വിരൽ മണ്ണിൽ താഴ്ത്തി, അവിടെ നടണം.

ഇങ്ങനെ ചെയ്താൽ വേരിന് കേട് വരികയില്ല.

നടിച്ചിലിനു ശേഷമുള്ള പരിരക്ഷണം

(1) ജപ്പാനിൽ കള പറിക്കുന്നതു് ഒരു അത്യാവശ്യകാര്യമായി കരുതപ്പെടുന്നു. അനാവശ്യമായ ഒരൊറ്റ ചെടിപോലും നിലത്തിൽ വളരുവാൻ ജപ്പാനിലെ കർഷകൻ അനുവദിക്കയില്ല. നടിച്ചിൽ കഴിഞ്ഞു് രണ്ടാഴ്ചക്കുശേഷം അയാൾ ആദ്യത്തെ കളപറിക്കൽ തുടങ്ങുന്നു. തുടർന്നു് ഈരണ്ടാഴ്ച ഇടവിട്ടു് അയാൾ കള പറിച്ചു കളയുന്നു.

(2) കള പറിയ്ക്കുമ്പോൾ നെല്ലിനു ചുറ്റുമുള്ള മണ്ണിളകുന്നു. ഇപ്രകാരം മണ്ണിനു് ഇളക്കം തട്ടുന്നതു് വളരെ പ്രധാനപ്പെട്ട ഒരു സംഗതിയായി ജപ്പാൻകാർ കരുതുന്നു. മണ്ണിളകുന്നതുകൊണ്ടു് വായുസഞ്ചാരം കൂടുകയും തന്മൂലം വേരു് പൂർവ്വാധികം ശക്തിയോടെ വളരുവാൻ ഇടവരികയും ചെയ്യുന്നു. അതുമല്ല, ഈ സമ്പ്രദായം ചെടിയുടെ ചുവട്ടിൽ ധാരാളം കട പൊട്ടികിളിക്കുന്നതിനു സഹായകരമാണു്. ജപ്പാൻകാർ സാധാരണ മണ്ണിളക്കുന്നതു് കൈകൊണ്ടോ, അതിനായി പ്രത്യേകം നിർമ്മിക്കപ്പെട്ട ചെറിയ ആയുധങ്ങൾകൊണ്ടോ ആണു്.

(3) ഇപ്രകാരം കള പറിക്കുന്നതും മണ്ണിളക്കുന്നതും, കതിരോല വരുന്ന സമയമാകുമ്പോഴെക്കു നിറുത്തണം. അതിന്റെശേഷം മണ്ണിളക്കിയാൽ വിളവു് വളരെ കുറഞ്ഞുപോകും.

ഈ ജോലികൾ ശ്രമകരമായി തോന്നിയേക്കാമെങ്കിലും നിലം അനാവശ്യമായ കളകളിൽനിന്നു രക്ഷിക്കാനും, വിളവു് ഗണ്യമായി വർദ്ധിപ്പിക്കാനും ഇതു വളരെ ഉപകരിക്കും.

(4) നടിച്ചിൽ കഴിഞ്ഞു് ഒരു മാസമാകുമ്പോൾ ഒരേക്കർ നെൽചെടിക്കു മീതെ 200 റാത്തൽ കൂട്ടുവളം വീതമാണം.

(5) ഈ കൂട്ടുവളം മുൻപു പറഞ്ഞിട്ടുള്ള മിശ്രിതമോ, അഥവാ നൈട്രജൻ, ഫോസ്ഫേറസ്, പൊട്ടാഷ് ഇവ മൂന്നും ഉൾക്കൊള്ളുന്നതും നൽകുന്നതിനു പ്രത്യേകം തയ്യാർ ചെയ്തിട്ടുള്ളതുമായ മിശ്രിതമോ ആയിരിക്കണം.

(6) ഈ മിശ്രിതം പ്രയോഗിക്കുന്നതു്, കളപറിക്കലും മണ്ണിളക്കലും നടക്കുന്ന സന്ദർഭത്തിലായിരുന്നാൽ, വളം ക്ഷണേന ചെടിയുടെ മൂലമേഖലയിൽ വ്യാപിച്ചുകൊള്ളും.

(7) നെൽചെടി വളരുന്നതിനിടക്കു്, രണ്ടാഴ്ചയിലൊരിക്കൽ പല തവണ വളം ചെയ്യുകയാണു് ജപ്പാനിലെ പതിവു്. വളം ചേർക്കലും മണ്ണിളക്കുക, കള പറിക്കുക മുതലായ ശുശ്രൂഷകളും ശരിയാംവണ്ണം വേണ്ട സമയത്തുതന്നെ നടത്തുന്നതുകൊണ്ടു് അവധാനത്തിൽ വളരെ നല്ലൊരു വിളവുതന്നെ അവർക്കു ലഭിക്കുന്നു.

കൊയ്ത്തു്.

(1) ജപ്പാനിലെ കൃഷി സമ്പ്രദായത്തിന്റെ ഫലമായി, ഒരു വമ്പിച്ച വിളവെടുപ്പു് ഉണ്ടാകുമെന്നുള്ളതു തീർച്ചയാണു്.

(2) നെൽച്ചെടികൾ വീണു നഷ്ടപ്പെട്ടുപോകാതിരിക്കുന്നതിനു്, നിലത്തുനിന്നും രണ്ടടി പൊക്കത്തിൽ 10 അടി അകലത്തിൽ സമാന്തരമായി കയർ വലിച്ചുകെട്ടുന്നു. വീണുപോകുന്ന നെൽച്ചെടികൾ ഈ കയറിൽ തങ്ങികിടക്കുന്നതിനാൽ കതിർക്കുലകൾ വെള്ളത്തിലും നിലത്തും തട്ടി കേട് സംഭവിക്കുന്നില്ല.

(3) വിളഞ്ഞുകഴിയുമ്പോൾ, നമ്മുടെ നാട്ടിലെപ്പോലെതന്നെ അരിവാൾകൊണ്ടു് നെൽചെടി ചുവട്ടിൽ വച്ചു് മുറിച്ചെടുക്കുന്നു.

(4) കൈകൊണ്ടു് എടുപ്പും പ്രയോഗിക്കാവുന്നതും, എന്നാൽ വളരെ ഫലപ്രദവുമായ ഒരുതരം യന്ത്രംകൊണ്ടാണു് ജപ്പാനിൽ മെതി നടത്തുന്നതു്. ചില കർഷകർ വൈദ്യുതസഹായത്താൽ നടത്തപ്പെടുന്ന യന്ത്രങ്ങളും ഉപയോഗിക്കുന്നുണ്ടു്.

മെതിയ്ക്കുക, പതിർ തിരിക്കുക, കുത്തുക ഇവ മൂന്നും ഏകകാലത്തു ചെയ്യുന്ന യന്ത്രങ്ങളും അവിടെ ഉപയോഗിക്കാറുണ്ട്.

ഈ കൃഷിസമ്പ്രദായത്തിന്റെ ചില പ്രധാന പ്രത്യേകതകൾ.

(1) കൊയ്ത്തു കഴിഞ്ഞാൽ ഉടൻ നിലം ഉഴതിടുന്നു.

(2) ശ്രദ്ധയോടുകൂടിയുള്ള വിത്തു തെരഞ്ഞെടുപ്പു്.

(3) അണുബാധയിൽനിന്നുള്ള വിത്തിന്റെ വിമുക്തി.

(4) വളരെ കുറച്ചു് വിത്തു മാത്രം ഉപയോഗിക്കുന്നു.

(5) ഞാറു്, ഉയർന്ന ഞാറുതടങ്ങളിൽ മുളപ്പിക്കുന്നു.

(6) ഞാറടികളിലും നിലത്തിലും ധാരാളമായി വളം ചേക്കുന്നു.

(7) വരിവരിയായി നടുന്നു.

(8) ചെടികൾ തമ്മിൽ വേണ്ടത്ര അകലമുണ്ടായിരിക്കും.

(9) ഞാറു് പിടിയായി നടാതെ ഒറ്റഒറ്റയായി നടുന്നു.

(10) ഇടയ്ക്കിടെ മുറപ്രകാരമുള്ള കൈപ്പരിക്കലും മണ്ണിളക്കലും നടത്തുന്നു.

(11) ഉദാരമായ തോതിൽ നെൽച്ചെടിക്കു മുകളിൽ കൂട്ടുവളം ചേക്കുന്നു.

ജപ്പാനിൽ ഉപയോഗിക്കുന്ന കൃഷി ആയുധങ്ങളും ഉപകരണങ്ങളും.

(1) കൈക്കലപ്പ. ചെറിയ തുണ്ടുനിലങ്ങൾക്കു് വളരെ ഫലപ്രദമായി ഉപയോഗിയ്ക്കാവുന്ന ഒരായുധം. ഇപ്പോൾ 60 ശതമാനം കൃഷിക്കാരും ഇതുപയോഗിക്കുന്നു.

(2) കൈത്തുമ്പ മണ്ണിളക്കാനും കള കിളച്ചു് മണ്ണിൽ മൂടാനും ഉപയോഗിക്കുന്നു.

(3) കൈക്കൊത്തി. ഇതും മണ്ണിളക്കാനുള്ള ഒരായുധമാണു്. ഉറച്ച നിലം ഇളക്കിയിടാൻ ഇതു വളരെ ഉപകരിക്കും.

(4) മെതിയന്ത്രം. ഇതു് കാൽകൊണ്ടാണു് നടത്തുന്നതു്. ഇതു് നിലങ്ങളിൽ എടുത്തുകൊണ്ടുപോകുന്നതിനു പ്രയാസമില്ല. നിലങ്ങളിൽ വച്ചുതന്നെ മെതിക്കുന്നതിനാൽ, കറ്റ ചുമന്നുകൊണ്ടുപോകുമ്പോൾ ഉണ്ടാകാവുന്ന നഷ്ടം സംഭവിക്കയില്ല. എട്ടു മണിക്കൂറെങ്കിലും അതിൽ കൂടുതലൊ ജോലിചെയ്താലും, ജോലിക്കാരനു് ക്ഷീണംതട്ടാത്ത വിധത്തിൽ ബോൾ ബെയറിങ്ങുകൾ (ball bearings) ഘടിപ്പിച്ചിട്ടുണ്ടു്.

(5) പതിർ മാറ്റുന്ന (തൂറ്റുന്ന) യന്ത്രം.

ഇതു് പതിരും പൊടിയും മാറ്റുന്നതിനുവേണ്ടിയുള്ളതാണു്. ഇതു് ഏതു സമയത്തും എവിടെവച്ചും പ്രയോഗിക്കാം. നാം കാറ്റിനെ ആശ്രയിച്ചു കഴിയേണ്ട ആവശ്യമില്ല.

ഏറ്റവും ഉന്നതമായ സ്ഥാനത്തു കയറുവാൻ മനുഷ്യനു സാധിക്കും. പക്ഷേ, അവിടെ അധികകാലം താമസിക്കുവാൻ സാദ്ധ്യമല്ല.

ബർണാഡ്ഷാ.

നിങ്ങൾ ചോദിക്കുക

(ഈ പംക്തികളിൽ മണ്ണ്, കൃഷി, വളങ്ങളുടെ ഉപയോഗക്രമം ഇവയെ കുറിച്ചുള്ള പൊതുജനങ്ങളുടെ സംശയങ്ങൾക്ക് ഞങ്ങളുടെ കാർഷികവിദഗ്ദ്ധൻ മറുപടി നല്കുന്നതാണ്)

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നിങ്ങളുടെ മാസികയുടെ കഴിഞ്ഞ ലക്കത്തിൽ സൂപ്പർ ഫോസ്ഫേറും കമ്പോസ്റ്റും കൂടി കൂട്ടിക്കലർത്തി ഉപയോഗിക്കുന്നതു് ഉത്തമമാണെന്നു് എഴുതിയിരുന്നു. ഇപ്രകാരം കലർത്തുന്നതു് വളക്കുഴിയിൽ വച്ചുതന്നെ വേണമെന്നുണ്ടോ? അതോ, വളം വിളഭൂമിയിൽ പ്രയോഗിക്കുന്നതിനുമുമ്പു് നടത്തിയാലും മതിയോ?

ഉത്തരം

വളക്കുഴിയിൽവച്ചു് വളം നിർമ്മിക്കുന്നവേളയിൽതന്നെ സൂപ്പർ ചേർക്കുന്നതാണു് ഏറ്റവും നല്ലതു്. താഴെ പറയുന്ന കാരണങ്ങളാൽ വളം പ്രയോഗിക്കുന്നതിനു് സ്വല്പം മുമ്പു് സൂപ്പർ ചേർക്കുന്നതു് അത്ര ഫലപ്രദമല്ലെന്നു മനസ്സിലാക്കാം. വളക്കുഴിയിലെ ഓരോ തട്ടകത്തിനും മീതെ ഫോസ്ഫേറു് വിതറുന്നതുമൂലം അതു് മറ്റു വളങ്ങളുടെ കൂടെ ചേർന്നു് അതിൽ ലയിക്കുന്നു. കുഴിക്കുള്ളിലുള്ള അണുകപ്രവർത്തനം ഫോസ്ഫേറു് ത്വരിതപ്പെടുത്തുന്നു. കുഴിയിൽ നിക്ഷേപിച്ച വളങ്ങളുടെ വിയോജനക്രിയ പെട്ടെന്നു നടക്കുകയും ക്ലേദോല്പാദനം സംഭവിക്കുകയും ചെയ്യുന്നു. പാകൃജനകത്തെ (Nitrogen) സംരക്ഷിച്ചു് നിലനിർത്തുവാനും ഫോസ്ഫേറു് സഹായിക്കുന്നു.

നേരെമറിച്ചു് ഫോസ്ഫേറു് ഒടുവിലാണു് നാം കലർത്തുന്നതെങ്കിൽ ഈ പറഞ്ഞ പരിവർത്തനങ്ങൾക്കൊന്നിനും സമയം കിട്ടുന്നില്ല. അതു് കമ്പോസ്റ്റും ഫോസ്ഫേറും കൂടിയുള്ള ഒരു മിശ്രിതം മാത്രമെ ആകുന്നുള്ളൂ. മണ്ണിൽ വീണുകഴിഞ്ഞാലുടൻ ഫോസ്ഫേറു് ക്ലേദാംശങ്ങളുമായി (humus) പ്രതിസന്ധിച്ചു് അണുകപ്രവർത്തനം സമാരംഭിക്കുമെന്നുള്ളതു് ശരിതന്നെ. പക്ഷെ ഇവിടെ വിവരിച്ച സമയം വളരെ നഷ്ടപ്പെടുന്നു. അതിനാൽ നിർമ്മിച്ചെടുത്ത കമ്പോസ്റ്റിനോടുകൂടെ ഫോസ്ഫേറു് ചേർക്കുന്നതു് തീർച്ചയായും വളക്കുഴിയിൽ വച്ചുതന്നെ ഫോസ്ഫേറു് ചേർക്കുന്ന മാർഗ്ഗത്തേക്കാൾ മെച്ചം കുറഞ്ഞതാണെന്നുള്ളതിൽ രണ്ടു പക്ഷമില്ല.

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എന്റെ തോട്ടത്തിലുള്ള ഫലവൃക്ഷങ്ങളിൽനിന്നു് വളരെയധികം ഇലകൾ കൊഴിഞ്ഞുപോകുന്നു. എന്തുകൊണ്ടാണു് അപ്രകാരം സംഭവിക്കുന്നതു്? പ്രതിവിധിയെന്തു്?

ഉത്തരം

അപാക ഫലപതനം (Prenature Shedding) എന്നു പറയുന്ന രോഗത്തിന്റെ ഒരു ഉദാഹരണമാണ് നിങ്ങൾ പറഞ്ഞതു്. ഇതു് പല കാരണങ്ങളാലുണ്ടാകാം. ചിലപ്പോൾ മണ്ണിൽ ജലം കെട്ടിനില്ക്കുന്നതുകൊണ്ടു് ഇതു സംഭവിക്കാം. മറ്റു ചിലപ്പോൾ അതുധികമായ ജലക്ഷാമം കൊണ്ടായിരിക്കും ഇതുണ്ടാവുക. എന്നാൽ ചില അവസരങ്ങളിൽ ജലസേചനം വിധിപ്രകാരം നടത്തുമ്പോഴും മണ്ണിന്റെ പോരായ്മകൊണ്ടു് ഇങ്ങനെ സംഭവിക്കാവുന്നതാണ്. ഉദാരമായ വളപ്രയോഗംമൂലം ഈ ദുരവസ്ഥ പരിഹരിക്കാം. ശരിയായ നിലയിൽ കലർത്തിയതും ഭാവഹാനിപ്രധാനവുമായ മിശ്രിതവളം ഉപയോഗിക്കുന്നതാണ് ഉത്തമം. ഈ മിശ്രിതം രണ്ടു പ്രാവശ്യം പ്രയോഗിച്ചാൽ ഈ അപാക ഫലപതനം തടയാം. മിശ്രിതം പ്രയോഗിക്കുന്നതിനു മുമ്പു് മണ്ണിന്റെ പ്രതിപ്രവർത്തനം പരിശോധിക്കുന്നതു് നല്ലതായിരിക്കും. അമ്ലബാധിതമായ മണ്ണാണെങ്കിൽ ചുണ്ണാമ്പോ കുമ്മായമോ ചേർത്തു് അതിനെ നിർവ്വീര്യമാക്കേണ്ടതുണ്ടു്.

തെങ്ങിനും കുമിനും ഈ അപാക ഫലപതനം 'മഹാലിബാധ' (Mahali disease) എന്നറിയപ്പെടുന്ന കുമിൽ പ്രവർത്തനംകൊണ്ടും ഉണ്ടാകാവുന്നതാണ്. വൃക്ഷങ്ങളുടെ ശിരോതലത്തിൽ ബോർഡോ മിശ്രം തളിക്കുന്നതു് ഈ രോഗത്തിനൊരു പരിഹാരമാർഗ്ഗമാണ്.

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കഴിഞ്ഞ രണ്ടുമൂന്നു പ്രാവശ്യമായി എന്റെ നെൽകൃഷി മോശമായി വരുന്നു. ഓലകളുടെ നിറം പകർന്നു് ഇടയ്ക്കിടയ്ക്കു് മഞ്ഞനിറത്തിലും തവിട്ടുനിറത്തിലുമുള്ള പുള്ളികൾ കാണപ്പെടുന്നു. ഈ ലക്ഷണങ്ങൾ എന്താണ് വെളിപ്പെടുത്തുന്നതു്? പരിഹാരമാർഗ്ഗം എന്താണ്?

ഉത്തരം

ഇടയ്ക്കിടെ ചില സ്ഥലങ്ങളിൽ കൃഷി മോശമാകുന്നതും നിറപ്പകർച്ചയുണ്ടാകുന്നതും മണ്ണിന്റെ അമ്ലബാധ നിമിത്തമാണു്. മണ്ണിന്റെ പുളിരസം എന്നു പറയുന്നതും ചുണ്ണാമ്പിന്റെ കുറവെന്നു പറയുന്നതും ഒന്നുതന്നെ. ചുണ്ണാമ്പിനു മാത്രമെ മണ്ണിന്റെ അമ്ലബാധയെ തടയാൻ സാധിക്കൂ. ചുണ്ണാമ്പിന്റെ അംശം കുറയുന്നതിനനുസരിച്ചു് പുനഃ സ്ഥാപിക്കുന്നില്ലെങ്കിൽ പുളിരസാധിക്യമുണ്ടാകുകയും മണ്ണിന്റെ ഫലപുഷ്ടി കുറയുകയും ചെയ്യും. ഫോസ്ഫോറസ് അതുപോലെയുള്ള പ്രധാന വളാംശങ്ങളും ചെടിയ്ക്കു് ലഭിക്കാതെ വരികയും ചെയ്യുന്നു. ഈ അമ്ലബാധ നിലത്തിൽ ഒരുപോലെയല്ല ഉളവാകുന്നതു്. ഇടവിട്ടു് ചില ഭാഗങ്ങളിൽ പുളിരസം കൂടിയിരിക്കുന്നതുമൂലം അവിടെ മുളയ്ക്കുന്ന ചെടികൾ അധികം താമസിയാതെ പൊലിഞ്ഞുപോകുന്നു. അതിനാലാണ് ഇടവിട്ടുള്ള ഭാഗങ്ങളിൽ കൃഷി മോശമായി കാണപ്പെടുന്നതു്. ഇലയ്ക്കു് നിറപ്പകർച്ചയുണ്ടാകുന്നതു് ചെടിക്കു് പ്രധാനപോഷകങ്ങളായ ഫോസ്ഫോറസ് ചുണ്ണാമ്പു് മുതലായവ അലഭ്യമായതിനാലാണ്.

ഈ കുഴപ്പം പരിഹരിക്കുവാൻ ഒന്നാമതായി വേണ്ടതു്, ചോക്കു് (Calcium Carbonate) മണ്ണിൽ ചേർക്കുകയാണു്. ഒരേക്കറിനു് 3 ടൺ എന്ന കണക്കിനു് ചോക്കുപൊടി ചേർത്തു് പല പ്രാവശ്യം ഉഴുതുമറിച്ചു് മണ്ണുമായി യോജിപ്പിക്കണം. മണ്ണിന്റെ അമ്ലബാധ കുറച്ചു് നിർവീര്യകരണാവസ്ഥയിൽ (P. H. 7) കൊണ്ടുവരാൻ എത്രമാത്രം ചോക്കുപൊടി വേണമെന്നുള്ളതു് പരീക്ഷണങ്ങൾകൊണ്ടു മനസ്സിലാക്കാം.

ഇപ്രകാരം ചോക്കുപൊടി ചേർക്കുന്നതുമൂലം മണ്ണിനു് വേണ്ടത്ര ഫലപുഷ്ടി ഉണ്ടാകുന്നതാണു്. എങ്കിലും ഉടൻതന്നെ പ്രത്യക്ഷഫലം പ്രതീക്ഷിക്കേണ്ടതില്ല. ചോക്കിനു് പുളിരസം ശരിയായി നീക്കുവാൻ ഏതാനും മാസങ്ങളോളം വേ

ണ്ടിവരും. മണ്ണിന്റെ ഉല്പാദനശക്തി വർദ്ധിക്കുന്നതിന് ചുണ്ണാമ്പ് ഒരു അത്യന്താപേക്ഷിതമായ ഘടകമാണ്.

ചോദ്യം 110.

എന്റെ തോട്ടത്തിൽ മാവ്, പേര മുതലായ ഫലവൃക്ഷങ്ങൾ നട്ടുപിടിപ്പിച്ചിട്ടുണ്ട്. ഫലങ്ങളുടെ ഭൂരിഭാഗവും ഏതോ പ്രാണികൾ കയറി ആക്രമിച്ചതായി കാണുന്നു തൊലിപ്പുറത്ത് തവിട്ടുനിറത്തിലുള്ള രേഖകൾ വീണിട്ടുള്ള ഫലങ്ങൾ കുറച്ചു കഴിയുമ്പോൾ അകക്കുട്ടിയില്ലാതെ സ്പോഞ്ചുപോലെ വന്നിട്ട് അടർന്നുവീഴുന്നു. എന്തുകൊണ്ടാണ് ഇങ്ങനെ സംഭവിക്കുന്നത്? എങ്ങനെ ഇതിനെ തടയുവാൻ സാധിക്കും?

ഉത്തരം.

നിങ്ങൾ പറയുന്ന ലക്ഷണങ്ങളിൽ നിന്നും ഡാക്കസ് ഫെറുഗിനിയസ് ഫബ്രിഷിയസ് (Dacus Ferruginous Fabricius) എന്ന ഗംഭീര നാമധേയധാരിയായ ഒരു തരം മാമ്പഴശലഭത്തിൽനിന്നും ഉണ്ടാകുന്ന ഉപദ്രവമാണിതെന്നുള്ളതിനു സംശയമില്ല ഫലവൃക്ഷങ്ങളുടെ ഒരു വലിയ ശത്രുവാണ് ഈ ജന്തു. മദ്രാസ്, മധ്യപ്രദേശം, ബീഹാർ, പഞ്ചാബ്, യു. പി. മുതലായ പല സംസ്ഥാനങ്ങളിലും ഈ ജന്തു പ്രത്യക്ഷപ്പെട്ടിട്ടുണ്ട്. മാമ്പഴം മാത്രമല്ല ഇതിന്റെ ലക്ഷ്യം. പേര, ആപ്പിൾ, റ്റ്പം, പീച്ചസ് മുതലായ വിവിധ ഫലങ്ങളേയും ഇതു് ആക്രമിക്കാറുണ്ട്.

ഈ ജീവിയുടെ ജീവിതചരിത്രം ചുരുക്കമായി അറിഞ്ഞിരുന്നാൽ അതിനെ കീഴമർത്തുവാൻ എളുപ്പമായിരിക്കും. ഇക്കൂട്ടത്തിലെ പെൺശലഭം ഫലത്തിന്റെ തൊലി ഭേദിച്ച് അതിനുള്ളിൽ മുട്ടയിടുന്നു വെളുത്തു നീണ്ട മുട്ടകൾ 2 മുതൽ 11 വരെ അങ്ങനെ തൊലിക്കുള്ളിൽ സ്ഥലം പിടിക്കുന്നു. ചിലപ്പോൾ ഒരു പഴത്തിൽതന്നെ പത്തു പന്ത്രണ്ടു സ്ഥലത്തു് ഇതുമാതിരി തൊലി പൊട്ടിച്ചു മുട്ടയിട്ടുവെന്നു വരാം. ചില ദിവസങ്ങൾ കഴിയുമ്പോൾ മുട്ടയ്ക്കകത്തുനിന്നും ഒരു വെളുത്ത പുഴു പുറപ്പെട്ട് പഴത്തിനുള്ളിലേക്ക് നുഴഞ്ഞുകയറുന്നു. വഴിക്കുള്ള ഫലഭാഗങ്ങളെല്ലാം തിന്നിറക്കിക്കൊണ്ടാണ് അതിന്റെ യാത്ര. എന്നാൽ പുഴു പൂർണ്ണവളർച്ച പ്രാപിച്ചു് അതിന്റെ സമാധിദശ ആകുമ്പോഴേക്കു് അതു പഴത്തിൽനിന്നും വെളിയിലിറങ്ങി അടുത്തുള്ള ഭൂമിയിൽ സ്ഥലം പിടിക്കുന്നു. ഭൂനിരപ്പിൽനിന്നു് 3 മുതൽ 6 ഇഞ്ചുവരെ താഴെ ആയിരിക്കും സാധാരണ ഇവയുടെ സമാധി സങ്കേതങ്ങൾ. കാലാവസ്ഥയ്ക്കനുസരിച്ചു് 6 മുതൽ 40 വരെ ദിവസങ്ങൾ കഴിയുമ്പോൾ പൂർണ്ണവളർച്ച പ്രാപിച്ച ശലഭം പുറത്തു വരുന്നു. ഈ ശലഭം ഏകദേശം ഒരു മാസക്കാലം ജീവിച്ചു് സന്തതിപുല്പാദനം നിർവ്വഹിക്കുന്നു.

ആക്രമണത്തിനു വിധേയമായ ഫലം അകക്കുട്ടിയില്ലാതെയും ഉള്ളിലുള്ള സാധനങ്ങളെല്ലാം കൂട്ടിക്കുഴഞ്ഞും കാണപ്പെടുന്നു. പുഴു ഇതിനകത്തു ചുറ്റിനടന്നു് ഭക്ഷണം സമ്പാദിക്കുന്നതുകൊണ്ടാണ് ഇങ്ങനെ വരുന്നതു്. തൊലിപ്പുറത്തുള്ള ചെറിയദ്വാരങ്ങൾക്കു ചുറ്റുംകടും തവിട്ടു നിറത്തിൽ വൃത്താകൃതിയിലുള്ള രേഖകളും ദൃശ്യമാകുന്നു. ദ്വാരത്തിൽനിന്നു് കുഴമ്പുപരുവത്തിലുള്ള ഒരുദ്രവകം ബഹിർഗ്ഗമിച്ചുകൊണ്ടിരിക്കുന്നതും കാണാം. അവസാനമായി ആ പഴം മുഴുവൻ അളിഞ്ഞു്, ഞെട്ടറ്റു നിലംപതിക്കുന്നു. പഴത്തിൽനിന്നും പുഴു സമാധി സങ്കേതമന്വേഷിച്ചു വെളിയിലിറങ്ങിയ ദ്വാരങ്ങളും പഴത്തിന്റെ പുറത്തു കാണാം.

ഈ ജന്തുവിന്റെ ബാധ തടുക്കുന്നതിനു് താഴെ പറയുന്ന ഉപായമാർഗ്ഗങ്ങൾ പ്രയോഗിക്കണം.

ആക്രമണത്തിനു വിധേയമായ ഫലം, മറ്റു ഫലങ്ങൾക്കും ഉപദ്രവം വരുത്തിയേക്കാമെന്നുള്ളതുകൊണ്ടു് അതിനെ നശിപ്പിച്ചുകളയണം. ഭൂനിരപ്പിൽനിന്നും

തടി രണ്ടാഴ്ചയിൽ കുഴിയുണ്ടാക്കി, അതിനകത്ത് ഈ പഴങ്ങളിട്ട്, മുകളിൽ മണ്ണിട്ടു ബലമായി തല്ലിയമർത്തണം. അല്ലെങ്കിൽ അതിനകത്തുള്ള പുഴുക്കൾ രക്ഷപ്പെട്ടേക്കും. മറെറാരു മാർഗ്ഗം, ഈ പഴങ്ങൾ ഒന്നിച്ചു വെള്ളത്തിലിട്ട് ഒരു മണിക്കൂർ നേരം തിളപ്പിക്ക എന്നതാണ്. വൃക്ഷത്തിനു ചുററുമുള്ള കളകളും പാഴ്ച്ചെടികളും മുറയ്ക്ക് തെളിച്ചുകൊണ്ടിരിക്കണം. അല്ലെങ്കിൽ കേടു പിടിച്ച പഴം അവിടവിടെ ഒളിച്ചിരിക്കും. തോട്ടം മുഴുവൻ ശുചിയായി സൂക്ഷിക്കുക എന്നുള്ളതും അത്യാവശ്യമാണ്. ഈ ശലഭങ്ങൾ പ്രായേണ ഫലവൃക്ഷങ്ങൾക്കു കിഴെയാണ് താവളമടിക്കുക എന്നുള്ളതുകൊണ്ട് ഡീസൽ ഓയിൽ, സോപ്പ് മുതലായവ കലന്ന ഔഷധം മരത്തിൽ ചൊരിയുന്നതു് വളരെ ഫലപ്രദമാണ്. ഈ ഔഷധത്തിന്റെ കൂട്ട് ഇപ്രകാരമാണ്:

ഡീസൽ ഓയിൽ	—	1 ഗാലൻ.
സോപ്പ്	—	1 റാത്തൽ.
വെള്ളം	—	1 ഗാലൻ.

ഇത്തരത്തിൽ ഒരു കൂട്ടുണ്ടാക്കിവെച്ച്, പ്രയോഗിക്കുന്നതിനുമുൻപ് എട്ടിരട്ടി വെള്ളവും ചേർത്തുകൊള്ളണം.

അമോണിയാ ദ്രാവകം (Liquor ammonia) മുതലായ ചില രാസവസ്തുക്കൾക്കും ഈ വക ശലഭങ്ങളെ ആകർഷിക്കാനുള്ള ശക്തിയുണ്ട്. അതിനാൽ ഈ സാധനങ്ങൾ ഉപയോഗിച്ച് ഈ ജീവികളെ ആകർഷിച്ചു നശിപ്പിക്കാവുന്നതാണ്. 8 ഔൺസ് തവിടും, 8 ഔൺസ് ബോറാക്സും, 1 ഗാലൻ വെള്ളവും കൂട്ടിച്ചേർത്താൽ അതു് ഇവററകളെ ആകർഷിച്ച് ഹനിക്കുവാൻ പററിയ മറെറാരു മാർഗ്ഗമാണ്. ഫലവൃക്ഷങ്ങൾക്കിടയിൽ സങ്കലിതകൃഷി നടത്തുകയും, തോട്ടം ഭദ്രമായി സൂക്ഷിക്കയും സർവ്വപ്രധാനമായ പ്രമാണങ്ങളായി പരിഗണിക്കേണ്ടതാണ്.
