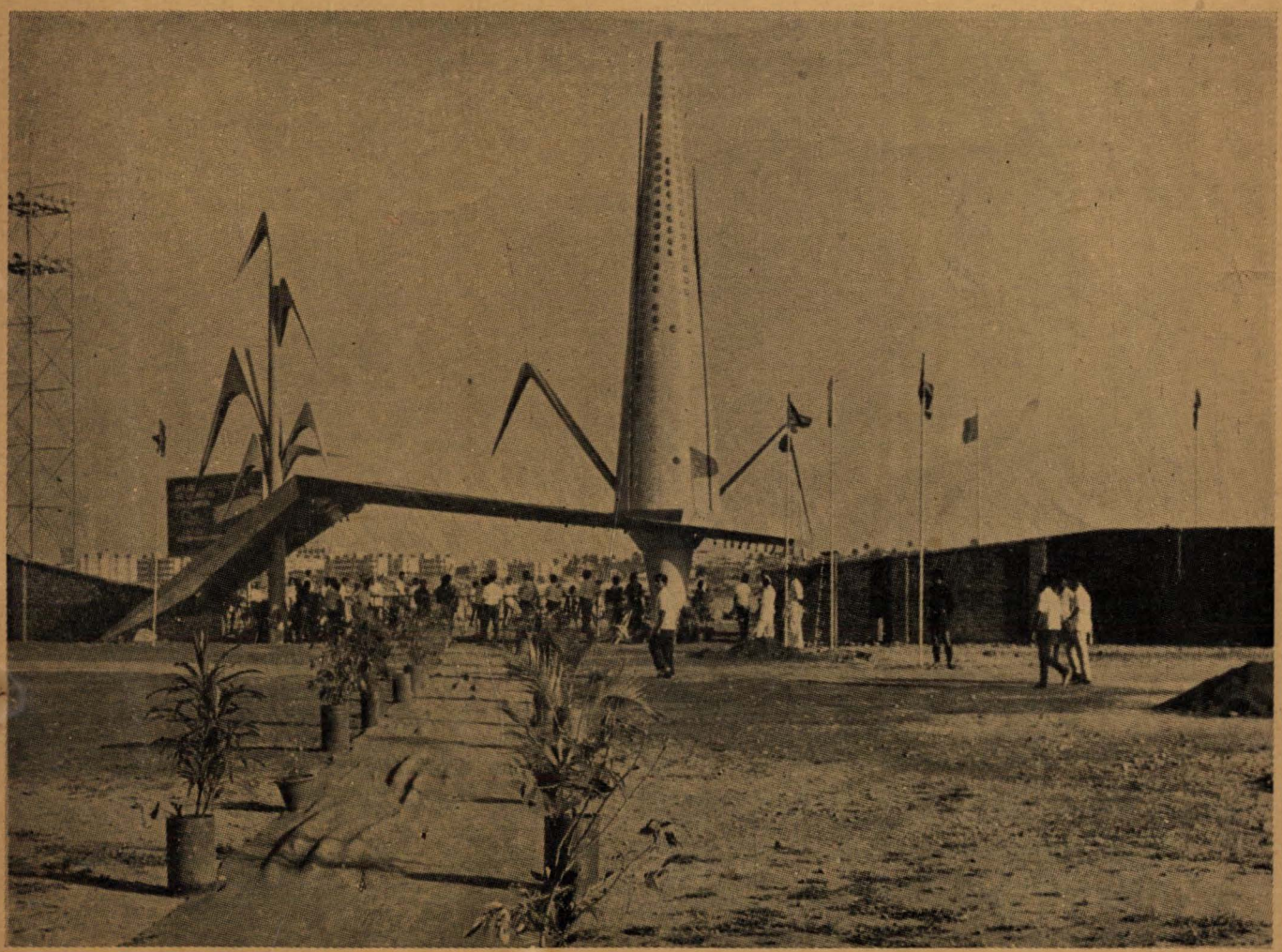
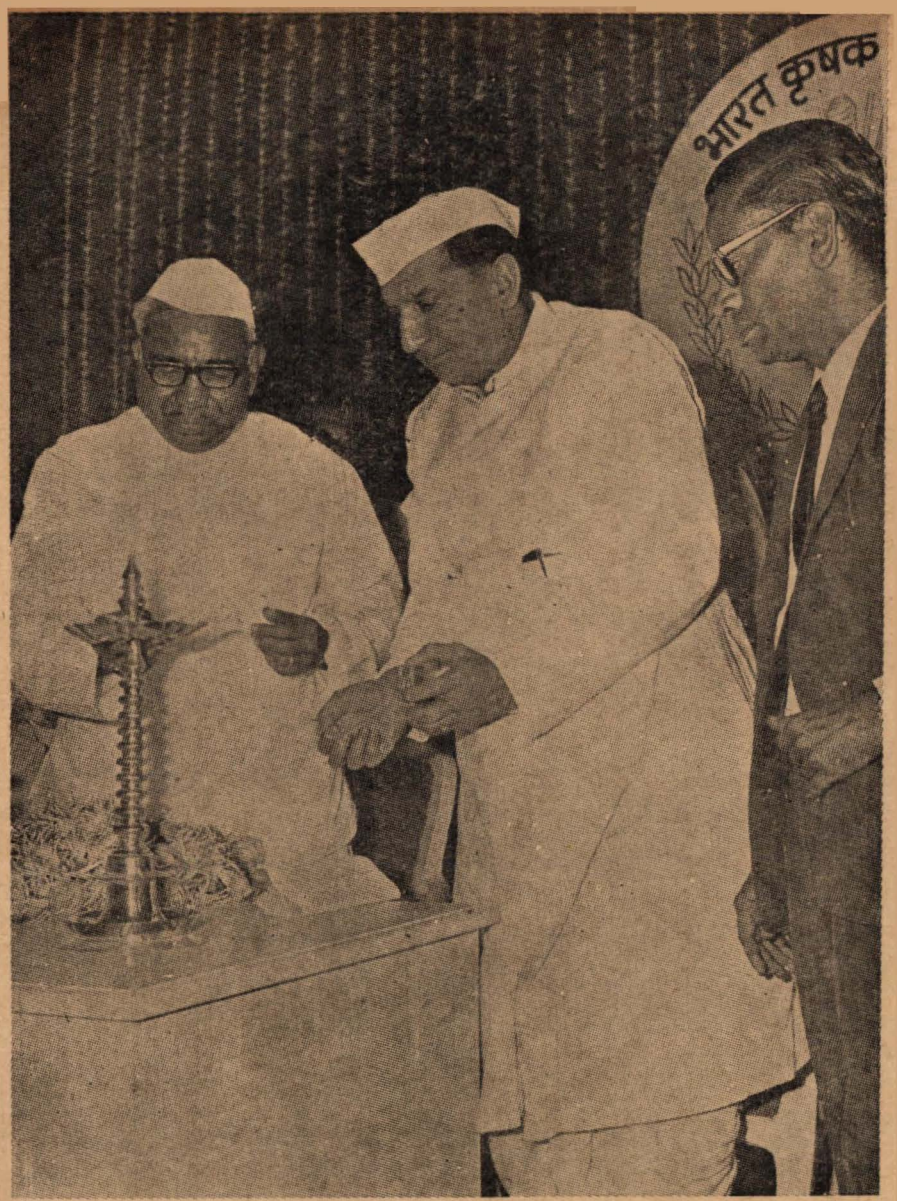
KRISHAK SAMACHAR

Vol. 13 No. 4 April 1969



Main Entrance of the Fifth National Agriculture Fair



Union Food and Agriculture Minister, Shri Jagjivan Ram kindling "Deepak" to declare opening of the Fifth National Agriculture Fair and seen with him are Shri S.N. Mushran, Chairman, Bharat Krishak Samaj and Shri S.N. Rao, Director of the Fair.

A Peep into the "Wonder-Land"

Fifth National Agriculture Fair in Full Swing

The Fifth National Agriculture Fair, organised by the Bharat Krishak Samaj, the premier national organisation of the farmers of India, would be a signal event in Bombay. Covering an area of 90 acres of which 20 acres have been set apart for Car Park, the Fair has roughly 5 miles of roads and the total length of cables used for electrifying is 20 miles. More than 5000 skilled workers were busily engaged day and night to give an attractive shape to the fair. Bombay witnesses a gigantic fair which is an eyeopener on the tremendous progress that the country as a whole has made not only in agriculture but also in architecture display techniques. The fair is of maximum educative value and serves to disseminate the technological developments taken place in the field of agricultural science during the recent past.

A Review of the Pavilions

Foreign Sector

The U.S.A., U.S.S.R., Federal Republic of Germany, Israel etc. are participating in this mammoth fair. Visitors from Gate No. 2 would be entering into the Foreign Sector directly where they can see the development of these countries in the field of agriculture and industry displayed in an articulate manner. The beautiful structure of the U.S.I.S. is flanked by the gigantic structure of the Indo-American Chamber of Commerce in which many commercial firms who are members of the I.A.C.C. are participating in a big manner.

The German pavilion consists of the Agro Industrial developments of Germany and the role the German Government and business community has played in developing the Indian economy. Israel on the other hand is displaying the success it has achieved in turning the deserts into fertile land and what sincere effort could bring about in revolutionizing and developing a country. The U.S.S.R. has come up through the "Tractoro export" which is displaying the tractors and other agricultural implements.

State Sector

The biggest pavilion in the fair is that of the host state covering an area of 85,000 sq. ft. of which 12,000 sq. ft. is ear-marked for demonstration on various aspects of agriculture. The theme of the pavilion is "Agriculture—mainstay of economy". Among many other sections the display of the tourist department and industries are indeed a notable feature and a visitor will require at least three hours to see the exhibits of this pavilion.

The Gujarat Government has also come up with an interesting display conveying the message of the Green Revolution and industrial and the Socio-economic changes that are taking place in this country in general and Gujarat in particular.

The Goa Government in turn has put an illustrative display of the agricultural development of the state with special reference to the climatic conditions.

Tamilnadu Government has taken up an area of about 8,000 sq. ft. and the Gopuram, which unique to S. India, is one of the main attractions of the pavilion. The statue of Thiruvalluvar with the inscription "Everything revolves and revolves around agriculture" is indeed symptomatic.

The Government of Mysore has also put up a massive structure consisting of the Agro-economic development of that state and the efforts being taken by mysore farmers

Now Electric Tractors too

The first batch of 100 power tiller tractors assembled locally in collaboration with Misubishi Heavy Industries of Japan, at a factory set up in Krishnaramapurm near Bangalore, has been released. A phased programme for their manufacture has been drawn up and the initial annual Production of 2000 units in the first year is proposd to be raised in the final stage to 5000 units annually. The 10 h.p. engine for the tiller tractor has been designed primarily for rotary cultivation both on wet and dry lands and for ploughing.

in increasing agricultural production. With a beautiful fountain in the rear, the Mysore pavilion is attracting the attention of the visiting farmers with sandal wood and handicrafts, for which the State is famous.

National Sector

The National Sector consists of nearly 50 commercial organisations mainly concerned with the rural industries and 4 Union Ministries. The pavilion of the Fertilisers Association of India, depicting the role of fertilizers in increasing agricultural prodution and the use of fertilizers in different soil conditions is of immense interest to the visiting farmers. The Agricultural Finance Corporation highlights the role of credit in bringiag about a revolution in the farms of this country and the activities initiated by the commercial banks in providing credit to the farming community. Tatas, Wal chand Group, Kirloskars etc. have come up with impressive pavilions. Directorate of Advertising and Visual Publicity has put up an impressive pavilion covering an area of 12,000 sq. ft. and the theme is "Science in Everyday Life".

As found in other similar fairs held elsewhere, the visiting public will have a fill of varied types of fun-fare in this Fair too. There is also a theatre for cultural shows.

Organised Visits of farmers

The organisers have taken initiative to bring farmers from different parts of the country and the State Governments are sincerely cooperating with the organisers in making this programme a resounding success. Farmers from Nagaland, Kashmir, Kerala and Orissa and from every part of the country would be coming to have a glimpse of India's agricultural progress. The Railway Board has decided to give railway concession so that good number of farmers can make use of this opportunity to visit this unique event and have the benefit of this signal occasion.

Seminar on "Farm Revolution"

The Bharat Krishak Samaj is organising an Experts' Seminar from the 3rd May to 6th May 1969, on the "Farm Revolntion".

The Seminar is being organised to have a serious probe into the various handicaps being faced by the Indian Farmers and the shortcomings of Indian Agriculture.

Experts from all over the world are expected to attend this Seminar. Many eminent personalities have agreed to contribute papers on various aspects of Indian Agriculture with special reference to the problems faced by the farmers.

The Seminar would be divided into 8 groups and there would be discussions on subjects like (a) Farm Management (b) Plant Protection Chemicals (c) Plants Food (d) Farmers' Organisation (e) Rural Credit (f) Dairying, Poultry and Animal Husbandry (g) Agriculture Machinery (h) Soil and Water Conservation. Subject matter specialists would also be attending this Seminar which will enable the participants to suggest concrete steps for overcoming the hazards that are being faced by the Indian Farmers,

'A World within a World'

The farm fair is gaining momentum in the city and it is being visited by lakhs of people. So far nearly 10 lakks have visited the fair and on Sunday more than one lakh people visited the Fair.

The Fair is creating a mixed reaction in the minds of the people of this city. Agriculture which is termed as something alien to city life is explained in a very simple manner in the fair and the views of the visitors are indeed interesting. This Fair, wherein Family Planning, Industries, food beverages, etc. etc are highlighted, has become a model of visual education.

The D.A.V.P. pavilion wherein the Family Planning is shown in a very simple manner is attracting a large crowd. The puppet show on Family Planning has become the centre of attraction. Mrs. Baptista, wife of an architect, when asked to explain her views stated that she felt herself in a wonderland. Though not being a supporter of Family Planning due to religious faith, the simple and impressive display of the D.A.V.P. pavilion makes one think, "It is a must in the interest of both the individual and the nation", she said. She said that she was not properly informed about the Family Planning till her visit to the Fair. Each Pavilion she visited was offering something new and unique which she had not seen or known.

"A city within a city or a world within a world", was the comment of a young engineer who visited the fair.

TENTATIVE PROGRAMME OF THE CONVENTION

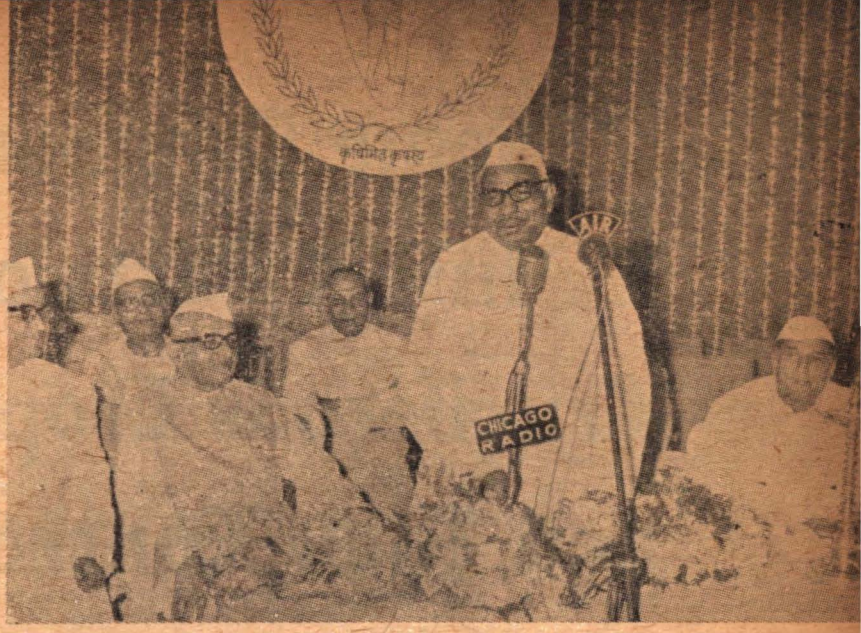
May. 1969

Wednesday, 7th	
9.00 a.m.	Registration of the delegates begins.
3,00 p.m. to 5.00 p,m.	Inauguration of the 22nd meeting of the All India Farmers Council.
Thursday, 8th	
10.00 a.m. to 12.30 p.m.	Council meeting continues.
3.00 p.m. to 5.00 p.m.	Inauguration of the Thirteenth National Convention of Farmers.
Friday, 9th	
10.00 a.m. to 12.30 p.m.	Convention continues,
3-00 p.m. to 5.00 p.m.	Plenary Session of the National Convention of Farmers.
Saturday, 10th	Local sight-seeing

The Members can see the National Agriculture Fair every day from 5.30 p.m. to 10.00 p.m.

"Indian Farmer Not Ignorant"

—JAGJIVAN RAM



Union Minister for Food and Agriculture Shri Jagjivan Ram delivering inaugural address and with him on the dias are (from left to right) **Dr. D. A. Bholay, Director General, Fifth National Agriculture Fair, Shri P. K. Sawant Agriculture Minister, Maharashtra, Shri S. N. Mushran, Chairman, Bharat Krishak Samaj, and National Agriculture Fair.** (2nd row : from left to right) **Shri B. C. Choudhari and Shri Vishnu Hari Patil**

The Fifth National Agriculture Fair was inaugurated on the 23rd March, 1969, by Shri Jagjivan Ram, Union Minister for Food, Agriculture, C.D. & Cooperation.

Shri P. K. Savant, Minister for Agriculture, Government of Maharashtra, presided over the function.

In his inaugural address, Shri Jagjivan Ram stressed the need of organising such agricultural fairs in industrial cities like Bombay, so that the city folks could be educated on the modern methods of cultivation. He emphasised the paramount need of giving wholehearted support by the government, the industry and the scientisits to the hero of the "Green Revolution", the farmer. He also called upon educated young men to take to agriculture, now that it has turned to be a profitable proposition.

Indian Agriculturists might be illiterate, but not ignorant or unwise. The Indian farmer has the initiative drive and adventurous mature which has been proved by their performance during the last two years. They had shown that they could rise up to the occasion and accept any challenge in their field. He reminded the city folks that the fruits, vegetables and other food articles come from villages and it was their moral responsibility to look into what was happening in the villages of this country. He said that very few people even now knew agriculture formed the very foundation of the industry. Shri Jagjivan Ram added that the farmer produced the goods for the well-being of his fellowmen.

Agricultural revolution was a part of the social revolution that is taking place in this country and called upon the educated strata of the society to remember that agriculture was not a dry subject.

Dr. Deshmukh's Statue garlanded

Earlier Shri Jagjivan Ram garlanded the statue of Dr. Panjabrao Deshmukh, founder President of the Bharat Krishak Samaj.

Shri Savant Presides

Shri P. K. Savant, Agriculture Minister of Maharashtra State, in his Presidential address said that the agricultural revolution was not an accident, but the creation of constant efforts. Shri Savant also spoke about the utility of organising such fairs in the cities.

The fair was a great attempt in visual education and its being held in Bombay City was calculated to impress upon its citizens that agriculture was the main industry.

Mushran Welcomes Chief Guest

Earlier, Shri S. N. Mushran, Chairman of Bharat Krishak Samaj, in his welcome address recalled the tremendous success of the World Agriculture Fair organised by the Bharat Krishak Samaj in the year 1959-60 and the impact it had created all over the country. He stressed the idea of organising fairs in different parts of the country in order to disseminate the modern agricultural practices and scientific farming to the farmers of this country.

Dr. Bholay Presents Report

Dr. D. A. Bholay, Director General, of the fair in his report said that the fair, held on an area of 90 acres, was planned in such a way so that the visiting farmers would be able to enrich their knowledge on agriculture and other allied sciences. The total length of the roads inside the fair ground is nearly 4 miles, electrical and water installations is nearly 20 miles.

Messages from Dignitaries

Shri S. N. Rao, Director. of the fair read out the Messages received from many dignitaries, like the President, Vice-President, prime Minister, Deputy Prime Minister and many others.

Anwikar proposes vote of thanks

Shri M. S. Anwikar, Executive Chairman, in his vote of thanks said that the fair was the collective efforts of a group of hard-working sincere men, who started work six months ago. He thanked the Government of Maharashtra for extending all the cooperation in making this fair a success. Shri Anwikar also spoke about the assistance and help given by various participants in making this fair grand success.

Some Common Insect Pests of Cruciferous Crops and Their Control

Dr. M. N. BORALE
Asstt. Professor of Entomology

AND

M. J. CHOUDHARI
Addl. Crop Protection Officer

College of Agriculture, Poona

Cruciferous crops are extensively grown in the Indian Union, of which mustard and rape provide a good source of edible oils and crops like cabbage; cauliflower; knolkhol; raddish; beetroot etc., as vegetables. Of the various factor responsible for low yields, the damage due to insects pests is the most important one. The successful cultivation of these crops, therefore, requires timely precautions to protect them from the various insects, pests like Daimond back moth (*Plutella maculipennis* C.) Mustard saw fly (*Athalia Proxima* K.); Aphids (*Brevicoryne brassicae* L.); Painted bug (*Bagrada cruciferarum*); Leaf miner (*Liriomyzus brassicae* R.); Bihar hairy caterpillar (*Diacrisia obliqua* W.) and Cabbage butterfly (*Fieris brassicae* L.). An attempt is therefore made in this article to give a brief account of these pests, along with the measures for their control.

Diamond back moth

It is a pest of regular occurrence on the cruciferous crops and is considered to be a serious pest of cabbage, cauliflower, knolkhol, etc.

The moth is small in size measuring about 8 mm. in length white coloured patch, which appears like shape of the diamond when both wings are folded. The larvae of these tiny moths are responsible for damage. They live on the underside of the leaves and feed initially on the epidermis and subsequently by cutting holes in the leaves. Heavily infested plants get completely skeletonized.

The female moth lays pale white eggs singly on the under surface of the leaves. They hatch in about weeks' time. The larval stage is completed in a fortnight. Full grown larva is green in colour and about 12 mm. in length, with body thick in the centre and tapering towards both ends. Pupation takes place on the leaf and the pupa remains sticking to the leaf surface by means of a silken thread. Pupal stage lasts for 6-8 days. The pest is active from September to March, during which period it completes 5-6 generations.

Control mcasures

Spray the crop with pyrethrum extract (1 : 800) or spray DDT at 0.25 per cent concentration (½ kg. of 50% DDT—wettable powder in 100 litres of water).

Mustard saw fly

This insect is potentially a serious defoliator of cruciferous plants in the fields. Though the name of the pest-signifies its relation with mustard crop only, its damage is in no way restricted the mustered crop, but is seen to infest almost all the cruciferous crops.

The fly is a small beautiful insect, having bright orange coloured body, black head and smoky wings with conspicuous black wing venation. Young larvae initially feed on the epidermis and subsequently by cutting holes in the leaves and also from margins. The plants are completely defoliated in the case of severe incidence of the pest.

The female fly deposits eggs singly inside the leaft issue along the leaf margin by means of its saw like ovipositor. The eggs hatch in about 6-8 days. Full grown larva is black in colour measuring about 18 mm. in length, with 8 pairs of legs on the abdomen. When touched it falls on ground feigning dead. Larval stage occupies 10 to 12 days and the pupation takes place in an earthen cocoon inside the soil. Pupal stage lasts for 13 to 15 days. Though the pest breeds throughout the year, it is more active from November to March.

Control measures

(1) In the nursery or when the crop is in the initial stage hand picking and destruction of larvae is effective.

(2) Spray the crop with 0.05% malathion (100 ml. of malathion

Natural Rubber Production Increases

Production of natural rubber in 1968-69 has been estimated at 69,000 Tonnes which is 5,000 Tonnes above the target and represents an increase of over 25 per cent within last two years.

50% E.C. in 100 litres of water) or 0.02 per cent Diazinon (100 ml. diazinon 20% in 100 litres of water) or dust the crop with 5-10 per cent BHC dust @ 8kg. per acre.

Aphids

Aphids belong to well defined group of insects with soft bodies and piercing mouth parts. They are regarded as a very serious pest of cruciferous crops, throughout the Indian Union.

Aphids are of different colours and measure about 3 mm. in length. They pierce the plants and suck the sap from young shoots and pods. As a result the affected leaves usually get curled and in case of severe infestation the plants wilt and wither. Moreover the aphids secrete 'honey dew', which spreads on leaves and make them sticky. A black mould developes on such plants giving them black blighted appearance.

The apids multiply parthenogenetically and live in colony. Aphids seen on the plants are mostly wingless females which produce tiny young ones. They become fully grown in about weeks' time and start producing other young ones. These aphids multiply generation after generation in geometrical progression until their huge population becomes deadly to the crop. When the crop is nearing harvest, the winged aphids appear on plants, which then migrate to other crops.

Control measures

Dust the crop with 0.65 per cent lindane dust or 10 per cent BHC dust at the rate of 8kg. per acre. Or spray the crop with 0.03 per cent concentration of parathion (60 ml. of parathion 50% E.C. in 100 litres of water), or malathion at 0..05 per cent concentration (180 ml. of malathion 50% E.C. in 100 litres of water) or diazinon at 0.04 per cent concentration (200 ml. of diazinon 20% E.C. in 100 litres of water) or dimethoate at 0.04 per cent concentration (100 ml. dimethoate 40% E.C. in 100 litres of water).

Painted bug

It is one of the serious pests of cruciferous crops and is reported from many parts of the country. Though the bugs are found in the fields almost every year, during certain years only they become abundant and cause heavy-losses to the cruciferous crops.

It is a small bug, measuring about 4 mm. in length. Since, it has got red and yellow markings on its black coloured body, it is called as painted bug. The nymphs and adults suck the sap from cruciferous plants, resulting in sickly appearance and poor growth. The young plant that are attacked generally wilt and die. Therefore, many times resowing becomes necessary.

The female bug after mating deposits eggs on leaves stem and inflorescence of plants, singly or in batches of 12. The eggs are pale yellow in colour. The eggs hatch in about 2-5 days. The pest is active in the fields from October to March.

Control measures

1. Since, painted bug is a polyphagous pest clean cultivation is necessary to keep the pest check.

2. Dust the crop with BHC 10% dust @ 8 kg. per acre or carbaryl 10% dust @ 8 kg. per acre.

Cabbage leaf miner

Adult is a minute dipterous fly having yellowish body and dark brown, head and legs. It measures about 2.5 mm. in length. Female, punctures a series of holes along the margin of tender leaves with its ovipositor. As a result the attacked portion dies up. Maggots of the fly mine into the epidermis of leaves, causing serpentine mines. When the incidence is heavy the seedlings are destroyed completely and resowing becomes necessary.

After copulation the female lays eggs singly inside the leaf tissues along the margin of tender leaves. Incubation-period lasts for 3-5 days and maggots attain full growth in 3-6 days. Pupation takes place in the soil, which lasts for 9-11 days. Full life cycle is completed in about three weeks time.

Control measures

1. If the infestation is observed in the nursery in the initial stage of crop, prunning of infested leaves should be followed.

2. Spray the crop with 0.2 per cent DDT (400 gm. of DDT 50% W.P. in 100 litres of water) or 0.04 per cent endrin (200 ml. of endrin 20% E.C. in 100 litres of water).

Bihar hairy caterpillar

It is one of the cosmopolitan and polyphagous insect. The pest is sporadic in occurrence. The moth is medium sized and the caterpillars are covered with hairs. The catepillars feed on the foliage and in bad cases of attack the crops are completely destroyed.

The female moth lays eggs in clusters on the leaf surface which hatch in about weeks' time. The caterpillars—after hatching start feeding on the foliage of plants and become full grown in about 3 weeks time. Pupation takes place in silken and hairy cocoons in the soil, which occupies about 10 days.

Control measures

1. Hand picking and destruction of egg masses and larvae was recommended previously.

2. Dust the crop with BHC 10% dust @ 8-10 kg. per acre.

Cabbage butterfly

This insect occurs on all types of cruciferous crops. The butterflies of this insect are white in colour with wing expanse of about 43 mm. The caterpillars feed on the leaves of host plant and in case of heavy infestation the plants are completely defoliated.

All the stages of the pest are completed on the host-plant. Full grown larva measures about 30 mm. in length and is velvety green in colour. A life cycle is completed in 28-40 days. The pest is generally seen in the field from October to March.

Control measures

Dust the crop with pyrodust or 10 per cent BHC dust @ 8 kg. per acre.

Target of Cotton Production

Cotton production in the country is to be stepped up from the targetted production level of 63 lakh bales in 1968-69 to 81.07 lakh bales by the end of Fourth Plan period. A working group of food and Agriculture Ministry placed the total demand for cotton by 1973-74 at 85-22 lakh bales.

Progress in Animal Sciences' Research

Dr. K. K. IYA
Dy. Director General (A.S.) I.C.A.R.

There is an increased consciousness among the people in our country for consumption of diets rich in proteins particularly those including animal products. This augurs well for the future and should pose a challenge to these engaged in animal production programmes in the country.

Fortunately, today we are better placed to meet this challenge with the scientific knowledge available for improvement of productivity of livestock and raising them economically.

India with its enormous livestock population including cattle, buffaloes, sheep, goats, pigs and poultry should be able to satisfy the protein hunger and malnutrition provided judicious use and conservation of the resources is planned and the productivity of the livestock is increased.

By and large, the level of production of our stock is very low as compared to countries which are more advanced in animal husbandry and livestock production practices. Even in our country in many farms, with the adoption of scientific methods of breeding, feeding and management practices, it is posible to raise the productivity of livestock comparable to their productivity elsewhere.

It is necessary that livestock keeping should be promoted as an industry. Emphasis must be laid ou raising per-unit production and per hectare production economically.

RECENT ADVANCES

In the recent past, considerable advances in the field of animal sciences research have been made to support the programmes for keeping in rearing of productive animals. Research work on the development of breeding methods, estimation of nutritional status of animal and formulating the nutritional requirements for optimum production and evolving of efficient disease control measures has made good progress.

The Indian Council of Agricultural Research has played a prominent role in the development of animal sciences research in the country.

Several Central and State research institutes like the Indian Veterinary Research Institute, the National Dairy Research Institute and Central Sheep and Wool Research Institute, the animal science departments of agricultural universities and the veterinary colleges in States working under the coordination of the Council have been engaged on problems of applied research, the results of which are proving useful in raising better and more productive stock.

Poultry Birds.

Poultry birds represent the quikest means of producing animal proteins in the form of eggs and meat. In the recent past, considerable research at several centres has demonstrated the adpatability of certain exotic breeds like the white Leghorn and Rhods Island Red, under Indian conditions in different parts of the country.

It is now possible under intensive system to raise commercially birds having an egg laying capacity of 180-220 eggs per annum. Research to develop the various lines further, not only to raise egg production but also to improve meat quality of birds and their efficiency for feed conversion are being continued in the newly expanded division of poultry research at the Indian veterinary Research Institute.

In addition to the pure breeds a quicker way of raising egg production is being explored through such genetic tools as exploitation of heterosis by crossbreeding of birds of different breeds. Further research in this direction is proposed to be taken up during the fourth plan for development of inbred lines of different breeds to produce hybird birds of better laying performance.

It is expected that it would be possible to provide four to five times more eggs per capita of the egg-consuming population in the country.

A serious handicap which the poultry industry faces to day is that the birds compete with human beings in consumption of cereals. India cannot afford to divert cereals in any substantial quantities for raising poultry when these are not available in sufficient quantities for consump-

How to Detect bruised Potatoes

Harvest bruises on potatoes generally do not show up until after storage and then it is too late.

According to American Scientists if potatoes are dipped in a solution of a chemical called "Catechol" bruised potatoes can be detected within less than five minutes as damaged potatoes turn dark reddish blue.

The test is quite handy one and can be performed even on the fields at any stage of harvest.

tion. Fortunately, research has shown that a large number of forest products, agricultural and industrial by-products like rice-polish, mahua seed cake, sal-fruit, silk-worm pupae, waste and slaughter house waste products like blood-meal, meat and fish meal produced from trash fish can be utilized to replace a large proportion of cereals in the poultry mesh.

Poultry keeping at one stage was gamble in this country due to the ingress of certain diseases which affected large flocks and completely wiped them out. Through research efforts, today we have suitable vaccines and sera to combat these diseases and to use preventive inoculations at appropiate age periods in chicks, against diseases like, the Ranikhet disease, fowl cholera and fowl pox.

SHEEP GOATS

Similarly sheep and goat raising offers considerable scope for increasing meat production, particularly by utilizing lands not completely suitable for intensive agricultural operations. However, the average carcass quality of the sheep or goat being poor at preasent, the farmers do not get a good return for their effort. It is posible to improve the meat quality of these animals through adoption of scientific breeding practices like selective breeding and cross-breeding and improving their nutrition and management. Researches are being conducted on Nellore and Mandya breeds of sheep to find out strains with the maximum carcass dressing precentage and high meat bone ratio.

Large flok of sheep in our country are, however, reared for wool production. The sheep in hilly regions also produces a comparatively finer quality of wool. In both cases improved strains with higher clip of finer wool quality require to be developed.

Extensive cross-breeding of local sheep with imported Rambouillettrams in Jammu and Kashmir, Himachal Pradesh, Uttar Pradesh, and Maharashtra has resulted in progressive improvement in wool yield and quality, in progeny which had up to three-fourths of exotic inheritance. The wool yield improved upto 50 per cent. Further, the average fibre diameter in the cross-bred sheep was decreased and there was a significant decrease in medullation of wool fibres. All these characteristics have helped to improve the quality of wool. The results of cross-breeding experiments are being extended on a large scale in sheep farming areas in the State mentioned above and in course of time these are expected to improve the quality of sheep in the region of the farmers. Among the sheep in the plains, selective breeding has much improved the fibre quality and increased almost three times the percentage of true wool fibres. The fleece has become less hairy and superior in quality.

Artificial Inseminations

The introduction of artificial insemination in cows and buffaloes saw a turning point in the genetic improvement of these animals. This technique, which was at one time looked upon with suspicion, is now fully accepted in almost ull areas of the country. It is now possible to use the few available superior breeding bulls with high milk potential for serving large cow populations, thus, helping to progeny which ultimately have higher lactation yields, early maturity and short calving intervals.

Thus with proper management the improved animals have a very high life-time of production of milk yield. They produce more calves in their life-time than the indigenons unselected animals. Research on articial insemination particularly in respect of preservation of semen to achieve a higher percentage of conceptions and calving, is being continued. It is now proposed to undertake deep-freezing of semen which can be utilized even years after the death of the donor bull.

Cross-breed Progeny

Research carried out under village conditions has amply demonstrated the utility of cross-breeding Indian cattle with exotic bulls to produce progeny with high milk production potential. Cross-breeding of cattle is now being practised in large parts of the country. The exotic bulls have brought about rapid improvement in the genetic make-up of the cross-breed progeny raising their efficiency for milk production and total lactation yields.

In different parts of the country, during summer months, milk supplies get reduced, This is largely due to seasonal breeding in buffaloes which are major source of milk supply. Resarch work done at U.P. College of Veterinary Sceince and Animal Husbandry at Mathura has amply demonstrated that the breeding season of buffaloes can be spread out thus making available an even milk supply throughout the year. Further extension of this work and researches are being continued to study the effect of various other factors involved in management of buffaloes.

Research is also being directed to exploit the possibility of augmenting the availability of animal proteins through breeding of improved pigs. The country pigs being small, do not produce good quality pork. Several improved breeds of pigs have been imported in the country for cross-breeding programmes on a large scale. Already the early results have been encouraging.

Several problems connected with the cross-breeding, food utilization, disease resistance, etc. of the exotic and cross-bred pigs are being investigated at different research stations in the country. It is hoped that this animal would make an important contribution in providing more animal protein in the dietary of the Indian population in the future.

The improved livestock can produce well only if they are protected against diseases. Several disease conditions like foot and mouth disease, rinderpest, brucellosis and work-infestations cause serious setbacks in livestock production programmes. However, through years of investigations and research. it has been possible to evolve sera and vaccines for prevention and control of diseases which at one time caused serious losses to the farmers. The biological products are now manufactured at the various centres and

(*Contd. on page* 20)

Bittergourd Growing Profitable

R. C. PANDE
Lecturer in Agronomy
J. N. K. V. V. College of Agriculture, Rewa (M.P.)

Bittergourd (Memordica Charantia Linn) Hindi name Karela, is believed to be originated in tropical regions of old world. It is cultivated all over India and some places it is found growing wild. It is also cultivated in Malaya, China and in tropical regions of Africa. The fruit has got good medicinal values and is beneficial for the patients of rheumatism. It is wormicidal and has a heatening effect. The root is astringent. Bittergrourd is a good source of Vitamin A,B and C and is rich in iron,

Delicious dishes for vegetarian and non-vegetarian can be prepared from bittergourd. Some housewives prefer to make a cut in the bittergaurd fruit, longitudinally and fill it with spices and then roast it. Others cut the fruit into small pieces, mix a little of salt and turmeric and keep it for sometime and then wash it thoroughly for a number of times. This process of thorough washing reduced the bitterness. Later on it is cooked for vegetables.

Climatic requirements :

It is a warm season crop whlch can be grown successfully in Kharif and Rabi seasons. It can resist slightly cold conditions better than other cucurbitaceous crops, but it is susciptable to extreme low and high temperatures.

Soil and soil preparation :

Bittergourd can be grown successfully in a variety of soils like sandy, loam, clayey, clayloam etc. but loam soils supplied with sufficient organic matter are best suited for growing bittergourd. When the crop is sown in a small area, digging should be done with the help of Gaiti or Kudali. But when the cultivation is done on commercial scale 3-4 ploughings should be done followed by one or two plankings to render the field suitable for its cultivation.

Manures and Fertilizers :

In remote village the crop is raised without the use of fertilizers and the growers dig the pits of suitable dimensions (one meter deep and 80 c.m. wide) and the growers dig the pits of suitable dimensions (one meter deep and 80 to 90 c.m. wide) at a suitable distance and fill the pit with two or three baskets of farm yard manure mixed with soil of the same pit. On commercial scale use of manures and fertilizers should be made and about 25 to 30 tons/ha of farm yard manure alongwith 60-80 kg/ha of nitrogen, 70-90 kg/ha of phosphorus and 60-70 kg/70 of potash should be applied for obtaining economical yields.

Farm yard manure should be broadcast and throughly mixed in the soil at the time of field preparation or may be mixed in the pits with the soil of the same pit, and half of the nitrogenous fertilisers and full quantity of phosphatic and potassic fertilizers should be applied before sowing or at the time of sowing the seed. The rest half dose of nitrogenous fertilizers may be applied after first weeding,

Rotations :

1. Bittergourd-onion.
2. Bittergourd-Garlic.
3. Bottlegourd-Cole crops-bittergourd.
4. Chillies-bittergourd.
5. Tomato-bittergourd.
6. Lady's finger-leafy vegetables-bittergourd.
7. Cowpea-cole crops-bittergourd.
8. Guar-root crops - bittergourd.

Varieties:

A large number of Desi and improved varieties of bittergourd are available throughout the country and among them 'Large White' and 'Small green' are common. An improved variety C-96 is grown in Punjab.

Time, Method of sowing and seed-rate :

Bittergourd is grown in north India in rainy season (June and July). The summer seasen crop is grown from February to March and April. In hills planting may be done in June and July. Bittergourd may be sown in pits of suitable dimensions filled with farm yard manure or compost and pit to pit distance may vary from 1.50 meter in summer season and 2.50 meter in

(*Contd. on page* 20)

Agricultural Census

Preparatory work for the first agricultural Census of India to study farmers reactions to improved farm tools, high yielding seeds, scientific method of farming etc. has been started Census will be conducted during 1970-73 simultaneously with the world Farm Census

Distant Hybridization: Development, Methods, Prospects

By ACADEMICIAN N. TSITSIN

In recent years we have witnessed an interesting fact: the appearance of plants, non-existent in nature. For instance, we have hard winter wheat, the sunflower with a 56 per cent oil content, and the perennial rye. Next in order is perennial wheat. This has become possible thanks to distant hybridization—the crossing of plants belonging to different species and genera.

Cultivated plants are the product of human labour. At the same time, they all decend from wild flora. By adpating them to his own purposes, man made them delicate, incapable of existing independently, In the course of millenniums, by promoting the richest harvests, accumulating in them the properties and characters which he required but which were not always beneficial to the plant.

Natural selection among the wild forms acted in quite a different way. In the course of millenniums they accumulated properties and characters which they themselves needed in the struggle for existence and propagation. The different roads in the evolution of cultivated and wild plants led to their sharp biological isolation and, therefore, when comparing them it is not hard to see that the majority of cultivated plants lack properties possessed by their wild kinsmen, and vice-versa.

Fruitful result

The method of distant hybridization is exceptionally promising both for science and practical agriculture. In our time we posed the task of obtaining as the result of the hybridization of wheat and couch grass—a plant, resembling wheat, which being sown once, would yield more than one crop, i.e,, which would be perennial, and not an annual. This problem has already been solved in principle: constant forms of perennial wheat, representing a new species, have already been produced.

Another, absolutely new species of wheat is second-growth wheat. It is to be presumed that in the future these will be most profitable forms. The thing is that after the grain has been reaped, the grain-fodder by hybrids are capable of continuing life. The aftergrowth is cut for hay and second growth begins again. Such wheat can be reaped first for hay and then for grain, or vice versa.

New Varieties

World on interspecific and intergeneric hybridization of grain is proceeding on a wide scale in foreign countries. By crossing soft wheat with Timothy, varieties have been obtained which are notable for their high resistance to rust and smut. In order to obtain immune varieties, soft and hard wheat is being crossed with Persian wheat.

In the United States hybridization of soft spring wheat with Russian Emmer led to the propagation of the well known varieties "Hope" and "N-44" which are being successfully used in many countries when selecting plants resistant to stalk rust. Interesting results have also been obtained when hybridizating such varieties as hard wheat and Turgidum, hard and soft wheat with Emmer. As a result rust-resistant varieties have been propagated in India, Italy, and a number of other countries.

Maize presents an interesting object for distant hybridization. At the All-Union Institute of Plant Breeding promising varieties have been obtained from interspecific hybridization—hybrids of maize and teosinte.

By distant hybridization extreemly valuable varieties of the cotton plant have been obtained. The method is also being successfully

SUGARCANE PLANTER

A New Automatic Device

A tractor-drawn automatic sugarcane planter capable of planting about four hectares a day has been developed by the Agricultural Engineering Wing of the Indian Institute of Sugarcane Research, Lucknow.

The planter, attached to the ridger body of the tractor helps do all planting operations like dropping setts, applying fertiliser, covering setts and compacting soil in one round.

The device can work in one or more units. Each unit plants one sett at a time.

applied in potato breeding and in the growing of vegetables. Many valuable hybrid forms of fodder plants have also been created. The method also found wide application in growing fruit and berries. It is particularly effective when crossing the cultivated forms with the wild, when propagating varieties with better wintering properties and resistance to diseases and pests.

New Technique

Lately, the possibilities of distant hybridization have been considerably increased thanks to theoretical researches and the elaboration of many new methods. The main reason for combining inability is the genetical dissociation of species and genera. Therefore, many plant growers resort to the intermediary method or hybridization by stages. But these methods are very lengthy and demand work on a very large scale. At present, other ways have been found. They are used optionally according to the genetic and other differences between the parent forms. The most effective method is to transfer one or both parent forms to a higher level of policy. Polypoloidization has played an important role in distant hybridization of many species.

In some diecotyledons the inability to combine is overcome with the help of Michurin's well-known method of preliminary vegetative hybridization of the parents. It is, applied, for instance, in hybridization of fruit and melon crops.

Selectionists also tell us that combining inability can be overcome by pollination with a mixture of pollen. Surgical shortening of the pistil in the maternal form may also be effective. For more intensive germination of the pollen and growth of the pollen tubes stimulators are used. Experiments have shown that the primary barrier of incompatibility in such generitcally distant genera as barley and rye can be overcome by the abovementioned method.

Obstacles

An important obstacle in the way of obtaining distant hybrids is the under-development of seeds, the embryo, in particular, insufficient development of the endosperm, or the formation between the embryo and the endosperm of a layer of cells, preventing the penetration of nutritive substances from the endosperm to the embryo, as, for instance, in the wheat-elymus hybrids. The method of cultivating under-developed embryos and tissues in artificial media, introduced in recent years, makes it possible successfully to overcome this obstacle too.

Distant hybrid plants of the first and, sometimes, of the second and third generations are sterile, as a rule. In the absence of conjugating chromosomes they prove to be entirely sterile, as, for instance, sterility can be overcome by producing amphidiploids. This can be achieved fairly easily with the help of colchicine. In plants thus treated the chromosomes do not disperse towards the poles and cells containing a double number are formed. In amphidiploids, division of the cells proceeds correctly or almost correctly with the formation of many viable sex cells.

Mechanisation Essential

Varieties with a high crop yield and well suited for cultivation in conditions of large-scale mechanised farming, possessing the necessary marketing properties, resistance to disease and pests, etc., in short, basically new selected forms of cultivated plants are to be created. By the joint efforts of specialists in different branches, applying the most different methods and means of training plants, among which distant hybridization will take an important place, we must solve these problems successfully. That will be an important contribution to the development of science and agriculture.

Where We Stand

An Indian firm has completed the prototype of a small Tractor with fully indegenous components. Price of the 12 horse power tractor is likely to be between Rs. 11,000 and Rs. 12,000.

* * *

The State Trading Corporation has concluded a trilateral trade arrangement with commercial Organisations of Bulgaria and Tunisia. Under the contract India will export tea and other commodities valued at Rs. 3.4 crores to Tunisia which will export to Bulgaria Phosphate of the equivalent value and Bulgaria in turn will supply Urea of the same value to India.

* * *

The Ludhiana College of Agricultural Engineering has developed a 15 quintal capacity air tight grain Tin which can protect grain against insects and pests and also preserve its quality.

* * *

The total food production in Bihar this year has been estimated 83.5 lakh tonnes, which is about 7.5 lakh tonnes more than the total yield last year. The increase is mainly due to the large scale introduction of high yielding varieties of seeds.

* * *

Norway has offered to sell fertiliser to India for Indian currency. It has also been indicated that Norway will consider giving long term credit for machiney required to set up fertiliser plants.

* * *

The Fertilizer Corporation of India has started exporting its products: The new complex fertiliser "Suphala" produced at Trombay is finding markets in Holland. 'Methanal' and Bicabonite have found their way into a number of west and south east Asian countries.

* * *

Farm Problems In Far East

For most of the region, total agricultural production in 1968 '69 is expected to equal of exceed last year's level. Exceptions include Mainland China and South Korea ; large areas of both countries have suffered unfavourable weather.

Rice harvests in 1968/69 will probably be up in the Philippines, South Viet-Nam, Thailand, Malaysia Indonesia, Ceylon, Pakistan, and Australia. Smaller rice harvest than last year are anticipated in Mainland China, South Korea, officially forecast at a record 14.4 million metric tons. With normal weather, both India and Pakistan can be expected to harvest near-record wheat crops, but Mainland China's wheat harvest is reduced. Corn production will be up significantly in India, Pakistan and Thailand. Grain Sorghum harvests will be larger in India.

Production of oilseeds may be down in 1968/69 largely because of unfavourable weather in major producing areas of India and Mainland China. Fruit and vegetable production will be at record levels in almost every country. The cotton crop will probably be slightly larger in Pakistan this year but is likely to be smaller in India and Mainland China.

Japan is the most important importer of farm commodities in the Far East and the major output for U.S. Agricultural products. In the first six months of 1968, Japan's imports of soybeans were up about 12% and totalled 1.2 million tons, U.S. Soybeans accounted for over one million tons, up some 17%. The United States supplied over half of Japan's imports of corn in January-June 1968, compared with 47% for the same period the previous year. Imports of U.S. wheat were up 7% in the first half of 1968.

The quantity of rice available for export in 1969 should be up in Thailand, Burma and Pakistan. Australia will have considerably more wheat for export. More corn will be available for export from Thailand; A significant development in the agricultural trade of several Asian Countries is the increased diversity of products for export, particularly processed products.

Every country in South & South-east Asia reports substantial increases in 1968/69 for acreage devoted to higher yielding varieties. Consumption of chemical fertilizers is increasing very rapidly. Farm mechanization is beginning to have an impact on production. The use of presticides, fungicides and other plant protection measures is expanding rapidly.

New approaches to external aid development of agriculture in the underdeveloped countries are emerging as traditional old sources decline. Many new initiatives toward agricultural improvements are coming within the region, In Japan, both government and private interests are accelerating their participation in the development of agriculture in the countries of Southeast Asia.

Measures to Boost Farm Production

Many different measures are being taken to boost farm production.

Malaysia, for example, is hoping to become self-sufficient in the production of rice primarily by expanding off-season crop areas. Double-cropped riceland in the 1968 season advanced to 157,000 acres, an increase of 50% over the previous year. Over 100,000 additional acres of prime land soon will become available for double cropping as the first sectors of the vast Sungel River Irrigation Project reach completion.

Farm mechanisation is beginning to have an impact on production, especialiy via more timely and better ploughing and certain other cultural practices. Farmers in India now have about 75,000 tractors, compared with an estimated 32,000 in 1961 and only 10,000 in 1951. The record 1967/68 wheat crop has provided many farmers in Northern India with funds to purchase tractor. About one fourth of all the tractors are located in Punjab and Haryana States. Domestic production in 1968/69 is expected to total 13,000 conventional tractors plus several thounsand garden-type tractors. However, this production plus imports of about 5,000 units annually is not expected to satisfy the growing demand. In Pakistan, the number of tractors used by farmers was placed at 19,000 at the beginning of 1968. This number is expected to double by 1971.

The use of presticides and other plant protection measures is expanding rapidly. The affected area in India is expected to reach 135 million acres in the 1968/69 season compared with 60 million acres the year before.

New Varieties.

The higher yield potential due to the use of improved varieties in the region was demonstrated on a wide scale for the first time with the 1967/68 grain crops.

The improved varieties of rice are largely products of the international Rice Research Institute at Los Banos, Philippines. The improved varieties of wheat in India and Pakistan have been developed from short-stem, high yielding varieties expanding rapidly and, in India, planting of improved grain sorghum varieties are showing good results.

Having successfully attained high volume and faster growth with their new varieties, researchers in the Philippines and elsewhere have shifted emphasis to the elimination of unfavourable qualities. For

example, IR-8 rice is susceptible to bacterial leaf blight, fungus and some kinds of rice blast. Unless thoroughly dried, which is difficult under humid tropical conditions it sprouts quickly in storage, tends towards poor milling quality and is not acceptable to all tastes. Other improved varieties have fewer of these characteristics, but usually have other weaknesses. The new varieties have forcefully brought out the need for improvements in processing and marking systems.

Fertilizers use increasing

Consumption of chemical fertilizers, negligible in most South and Southeast Asian Countries only a few years ago, is now increasing at a very rapid rate. Much fertilizer is being applied to improved varieties of rice and wheat. Although Japan, Korea and Taiwan's fertilizer production exceeds domestic requirements, many Asian countries lack the means for importing sufficient fertilizers.

India's fertilizer use increased from about 1.2 million tons (nutrient value) in 1966/67 to almost 1.8 million tons in 1967/68 and is scheduled to approach 2.8 million in 1968/69. Value of imports of fertilizers in 1968 was about $ 300 millions, with about 40% of the supply coming from the United States. About 60% of the fertilizer will be applied to grain crops—particularly rice, wheat and corn. A major part of the increase in fertilizers will be applied to the high yieiding varieties of grain that are estimated to cover 21 million acres this season out of a total of approximately 300 million sown to all grains.

In Pakistan, fertilizer use is scheduled to increase from about 420,000 nutrient tons in 1968/69 to over one million by 1970/71.

World Corn Crop Down

The world corn crop last year was 234 million metric tons. This was two per cent below the 1967 record high acreage remained the same in both years.

According to the U.S. Foreign Agricultural Service, corn production in North America is estimated at 126 million tons, down five per cent on four per cent less acreage. Canada's crop was two million tons, up five per cent. In the U.S., output was 113 million tons, up five per cent. In Mexico, production was nine million tons, up six per cent.

The European corn crop is estimated at just under 30 million tons, two per cent lower than 1967. In Western Europe, however, farmers produced 16% more corn at 11.8 million tons. The French crop was 33% higher than the previous year with yield at a new high of 77.1 bushels per acre and a total output of just under five million tons. Italian farmers produced four million tons of corn, and Spanish farmers, 1.5 million tons.

In Eastern Europe, farmers produced 17.7 million tons down 12% from the previous year and 21% below 1966. Drought hurt the major corn-producing nations. Yugoslavia's output was off by 10% at 6.5 million tons.

Russian corn production last year is estimated at moderately above 1967's 315 million ton crop.

In Asia, the corn harvest is estimated at 28.3 million tons, about the same as in 1967. The Australian crop is placed around 193,000 tons.

Australia Exports Cotton

Australia has entered the cotton export market. The country's first significant sale has gone to Japan which purchased 6,500 bales of Australian cotton. Another 3,000 bales have been sold in a second deal.

Historically, Australia has been a cotton-importing country. Production has been rising sharply in recent years, however, partly because of government encouragement in the form of direct payments to farmers. In 1968, Australia produced more raw cotton than was needed for domestic use for the first time. Prospects for 1969 are for even larger production, and Australian farmers looking for export sales.

Japan is highly interested in buying more cotton from Australia. Some reports suggest Japanese spinning industry officials hope eventfully to be able to import, 400,000, bales a year from Australia.

Global Agricultural Output

World farm production last year was good but not exceptional. That's the report from the U.S. Department of Agriculture which says farm output for the world as a whole increased from 1967 to 1968 at about the same rate as population. The Department's Economic Research Service says agricultural production rose three points to 130 with 1957-59 equalling 100. The index for agricultural production per person, however, remained at 107.

Total agricultural production has been rising at approximately the same rate in the developed countries, the Department says. However, production per person in the less developed areas has not risen as sharply as in the developed nations.

There were significant declines in farm production in 1968 in Austria, Hungary, Bulgaria, Rumania, Greece, Italy, Libya, Jordan, Syria, Lebanon, Cyprus and Turkey. There were smaller declines in most of the countries in West Africa from Senegal to Nigeria in much of the Southern part of Africa.

On the West Coast of South America from Ecuador to Chile, severe drought reduced output of most crops and will diminish water supplies for 1969.

On the other hand, growing conditions were favourably for most crops in a belt of countries from

U. S. India aid deal

A new food aid agreement between the United States and India has brought total U. S. Public Law 480 sales to India to nearly $4,000 million.

The programme began in 1954 and during the years since then India has received more than one-fourth of the total $13,200 million total in foreign currency sales to all countries by the United States.

Under the latest agreement, India is getting about $167 million in supplies, almost all wheat flour. Other items include $13 million in inedible tallow, $1 million in nonfat dry milk and some tobacco.

West Germany southwest through France and Spain to Morocco, and in Australia, Ceylon, India, Malaysia, Pakistan and Taiwann. Production also was up in the United States and Canada.

Not enough Potatoes

There is a potato shortage in Chile. Potato production has been drastically reduced by drought. The December-January harvest in the Country's key Central Valley was less than 20,000 tons, one-third of the crop in the same period of the previous season. With estimated requirements of 60,000 tons and a beginning stock of 6,000 tons, the deficit is more than 34000 tons.

Much of this will be made up through imports, but the deficit will not be entirely covered. The government has announced "potato holiday" in which potatoes will not be served in restaurants and other eating places operated by any agency of the Chilean Government. No potatoes were sold to the Armed Forces in December and January.

Kenyan Tea Record

Kenya has a record supply of tea. The 1968 tea harvest was well over 56 million pounds, the previous record. The higher output reflects new plantings coming into production and good growing conditions. At the beginning of 1968 tea acreage was more than 74,000 acres, compared with only 32,4000 in 1955.

Kenyan tea quality has been improving in recent years and prices received on the London Markets compare favourably with those paid for teas from Ceylon and India. The United Kingdom imports about two-thirds of the Kenyan exports.

Big Polish crop

Polish farmers had a bumper crop in 1968. Indications are that Poland's grain harvest may have been the biggest ever, while output of potatoes and sugarbeets also was high.

Total grain production is estimated to have reached around 18 million metric tons. Wheat, rye, oats, barely accounted for 17.2 million tons of this, nine per cent more than in 1967 and a record high.

The Polish rye harvest is estimated at around 8.9 million tons with oats at 2.8 million tons and barley at 1.3 million.

Potato production in Poland in 1968 is placed at around 46 million tons. Sugarbeet is estimated at more than 14 million tons. Both are down slightly from last year but still considered to be bumper crops.

Fertilizer output rises

World production of commercial fertilizers in 1967/68 rose by 8.1% over the previous season to a total of 57.7 million tons. At the same time consumption rose by an estimated 8.3% to 55 million tons.

These figures, prepared by the Food and Agriculture Organisation, show the largest increase in production occurred in Europe where output rose by 1.7 million tons to 23.4 million. North and Central American production increased 1.2 million tons to 17.6 million. Sharp increases of about 700,000 tons were estimated for Asia and the Soviet Union. Asian output is placed at 4.65 million tons and Russian production is 8.2 million tons. Production of fertilisers in Mainland China is estimated 1.2 million tons.

Europe continues to be the heaviest user of fertilisers, consuming 301 pounds of all fertilizer nutrients per hectare of arable land. This compares with 130 pounds in North and Central America; 81 pounds in Oceania; 64 pounds in Russia; 42 pounds in Asia; 31 pounds in South America and 11.5 pounds in Africa.

FAO's Fertilizer Industry Advisory Committee has been stimulating use of fertilizers in developing nations to increase food production. Under the committee's guidance, some 130,000 fertilizer demonstrations and trials have been carried out in 26 countries. Plans are under way for about 25,000 more demonstrations this year.

The Committee reports that production of nitrogen was about 25 million tons in 1967/68, 12% more than in the previous season. Output of phosphoric acid was 17.5 million tons, up 5.4%, and potash production rose by 4.8% to an estimated 15.2 million tons.

Record barley production

A record high production of barley occured in 1968. Output is estimated at 157.6 million tons, five percent above the 1967 record and 18% more than the 1960-64 average. Plenty of rain in Canada and the United States, alongwith good growing conditions in Northern and Western parts of Europe are largely credited for this big crop. World barley production last year is estimated at 107.2 million tons. up four percent. Canada's barley crop was 6.9 million tons, 27% higher than the previous year. In the United States, the barley crop was 9.2 million tons, up 15% over 1967.

The European barley crop was 45 million tons, down two per cent. In Western Europe output was 37.3 million tons, about the same as the excellent 1967 crop. The French crop was 8.9 million tons, down nine per cent, and the United Kingdom harvest was 8 8 million tons, down six per cent. Denmark produced a record high crop of 5.1 million tons, up 15% and the Spanish crop was up 35% at 3.5 million tons.

In Eastern Europe, barley production was 7.7 million tons, nine percent below 1967. Poland, East Germany and Czechoslovakia had good crops, but drought hurt crops in Hungary, Rumania, Yugoslavia and Bulgaria. In the Soviet Union barley production was slightly lower than 1967's 950 million bushels.

Barley production in Asia is estimated at 19 million tons, up four percent and in South Africa the output was about the same as in 1967.

Phosphate Deposits Discovered

Rock Phosphate deposits have been discovered by the Geological Survey of India in the Aravali formation near Udaipur in Rajasthan.

Let us be soil builder

By V. K. Gupta, P. S. Deol and S. D. Narang

Department of Soils, P. A. U., Ludhiana.

Good markets, good prices for farm products help to make farm prosperity, yet the best markets and highest prices won't bring prosperity to farmer unless he makes the soil productive. Practically everything connected with our national life is dependent on the crop producing power of the soil. That is the reason why the biggest problem in India, not only in agriculture but in all Indian life, is how shall we increase and maintain the fertility of the 'valuable soil.'

Number of factors are involved in maintaining the crop, producing power of the soil, namely, right use of fertilizer, and manures, use of lime, proper tillage, drainage, irrigation, good seed, weed control, crop rotation and soil conservation.

Some of the ways in which plant nutrients are lost from soil are given below :--

1. Nutrients removed by harvested crop. Every crop contains plant food removed from soil. Even the richest soil will not give good yield when crops are grown continuously on it.

2. Loss through leaching. Some losses of plant food elements are due to leaching of soluble nutrients with irrigation water or rain water. Sandy soils and bare soils leaching more than covered soils. Loss of nitrogen by leaching is more, loss of potassium less than nitrogen and phosphorus negligible.

3. Loss through erosion. Removal of soil by wind or water is called soil erosion. Erosion of soil removes a considerable amount of plant nutrients from the soil, when one tenth of the soil is washed away, one tenth of the plant nutrients are lost. The losses of nitrogen, phosphorus and potassium are proportionately the same due to soil erosion. The loss of nutrients by erosion depends on the rainfall, slope, wind velocity and type of crop.

There are other ways plants food is lost from the farm. The most serious waste, on farms where livestock is kept lies in the loss of plant food from the farm yard mauure and compost. The nitrogen and potash in manure are most easily wasted and lost. Considerably more than half of the total plant food valuable of manure and compost will be lost or destroyed before it reaches the land if they are exposed to the sun and rains.

The following are the aids which can help to conserve plant food in the soil;

Cover Crops

The crops sown occupy the land when it would otherwise be fallow, prevent leaching of plant food and protect the soil from sun, wind and rain. Thus, the soil erosion is also checked. The tiny feeder roots penetrate all parts of the soil and build up into organic matter to the soluble plant food which might otherwise be lost. When legumes are grown as cover crops they fix nitrogen of the air which can be used by the crops.

Compost and Farm Manure

Manure and compost will vary widely in the amount of plant food they contain. Animals eating poor quality will produce manure containing little plant food, organic materials grown on poor land will produce compost low in plant. Compost and other organic materials are the life of the soil. The quality of compost and manure can be improved and nitrogen conserved by applying superphosphate to the compost. The soil organisms depend on organic material for food and cause organic matter to be broken down to humus. In hot climate it decomposes rapidly and must be replaced regularly.

Crops prevent loss of nutrients

Roots and tops store up plant food moisture. The plant food are conserved when soil is shaded and soil erosion is prevented to a considerable extent.

Use of legumes

Legumes, through the aid of small organisms living in the nodules on their roots take nitrogen from the air and hold it in soil. The leguminous crops like, Dhaincha, Guara, Mong, Soyabean and Sannai, can be grown in the off season and green manured. These crops will add a good amount of nitrogen in the soil and improve the physical conditions of the soil. Some crops like Guara, Berseem and Sanji will add nitrogen even when harvested and used for fodder.

Use of Balanced Fertilizer

There are 17 plant foods, three are usually supplied in fertilisers i.e. nitrogen, phosphorus and potash. Plant food reduces number of barren stalks. Nitrogen promotes stem and leaf growth, phosphoric acid promotes early ripening, potash makes strong stalks and increases starch formation. Nitrogen and phosphoric acid increase root growth, A good crop needs all these three elements in certain proportion and even if one of them is deficient the growth and yield are effected, so it is quite essential that these three nutrients should be applied to the soil in right quantities. This is called the 'Balanced Application' of fertilisers.

Soil testing can help the farmers in selecting the balanced fertilisers for their crops, which is an urgent need for increasing crop production and maintaining the fertiliser of valuable soil.

Use of high analysis fertilisers

The cost of plant food per pound delivered to the farmer is always less in high analysis fertilizers than in fertilizers of low analysis. This is because freight, storage, handling, manufacturing and bagging represent a considerable portion of the final cost of the fertilizer.

The farmers should give preferance to the fertilizers like; Diammonium phosphate, triple super phosphate, Ammonium phosphate and Urea. High analysis fertilizer are most economical to purchase

and use.

Proper use of Plant food

Fertilizer and manures should be placed in such a way in the soil in the crop root can reach the applied plant food early.

Farm yard manure and compost should be spread evenly over the field and incorporated with the soil without delay to prevent the organic matter from burning. Phosphatic and potassic fertilizers must be applied before or at the time of sowing of crop and nitrogenous fertilizer should be applied in split doses before and after the sowing of crop.

Maintain humus in soil

Crops when harvested leave big amount of roots and stubbles. These roots and stubbles when returned to the soil add organic matter. The orgnic matter when returned regularly to the soil keeps it porous, allows rain and irrigation water to penetrate, air to circulate readily and act as a sponge to hold the moisture, all of which are essential for good plant growth. The amount of organic matter added to the soil, is more when crop is properly fertilized.

Proper Crop Rotation

This can be defined as a practice to grow a number of crops one after the other in a regular sequence rather than growing the same crop every year. There may be three or four or five years rotation and the cycle may be started from the beginning again. The rotation must have one or two close growing crops or legumes in it. It must have also crops of different root system, some deep feeders and some surface feeders, thus, drawing their nutrition from the different layers of the soil as compared ro the crops that feed on the same surface. In addition to the maintenance of soil fertility rotation helps in checking the weed insect, pest and diseases.

Fallow

The soil fertility may also be recouped by keeping the soil fallow that is not growing anything in the field for some season. This practice is of great use in barani area. During fallow, steps should be taken to conserve the moisture and weeds should be controlled properly.

Agricultural Implements

During the period of the first three five-year plan progress in the use of improved agricultural implements was rather slow. This was due to a shortage of iron and steel, lack of suitable designs for implements, high cost of manufacture, paucity of adequate and timely credit at responsible rates of interest to farmers for purchase of implements, non-availability of repair and maintenance facilities, difficulty in obtaining spare parts and lack of component extension machinery to demonstrate the effectiveness of improved implements.

However with the advancement in the programme of high yielding varieties of seed, occompanied by increased use of fertilizers, it has now become all the more essential to employ improved varieties of implements. The following three tables may give some indication to our related Donor Agencies as to estimates of Tractor Demand, and anticipated production of Agricultural Tractors in India.

TABLE 1

INSTALLED CAPACITY AND PRODUCTION OF TRACTORS

Name of the Unit		*H.P. of tractor licensed*	*Present installed capaclty per annum*	*revised licensed capacity per annum*	*Letters of intercst issued for additional capacity*
Eicher		26.5	1,200	2,000	—
Escorts	(a)	37	7.000	7.000	—
	(*b*)	27			
Hindustan	(*a*)	35	1,000	2,000	—
	(*b*)	50	1,800	5,000	—
International		35	3,500	3,500	5,500
TAFE		35	3,500	7,000	—
Proposed public seotor Project		20			12,000
TOTAL			18,000	26,500	18,500

*Internationals capacity is to be raised in two stages of 3,500 and 3,000 reaching finally an aggregate of 10,000 tractors per annum.

TABLE II

ESTIMATES OF TRACTOR DEMANDS

Year	*Nos.*
1966-67	20,000
1967-68	25,000
1968-69	30,000
1969-70	35,000
1970-71	40,000

TABLE III

ANTICIPATED PRODUCTION OF AGRICULTURAL TRACTORS IN INDIA (In nos.)

Unit	*1966*	*1969*	*1970*	*1971*
Eicher	172	1,200*	1,200*	1,200*
Escorts	2115	5,500	6,000	7,000
Hindustan				
(*i*) 50 HP	1070	2,000	2,200	3,000
(*ii*) 35 HP	800	1,400	1,500	1,800
International	550	3,500*	3,500	3,500*
TAFE	3,400	3,500	6,000	7,000
TOTAL	8,107	19,100	29,400	23,500

*Indicates present installed capacity as reported by producers, since no estimates of anticipated production have been furnished.

Integrated Pest Control in Ancient India

S. K. NIRMAL BHUTAN

The people in India control insects and pests, from ancient ages through celebration of their traditional religious festivals and rituals. If we probe deep into the system of festivals, religious inhibitions and taboos, we can discern a scientific approach of Indian farmers towards pest control throughout the year. For example we will first take the festivals of colourful Dipawali which is celebrated throughout India.

Dipawali

On Dipawali night people light lamps so that the Lakshmi the goddess of wealth will come in their houses. But let us think what is real wealth? Gold silver or what? Farm products alone are real wealth i.e. Lakshimi as discribed in Hindu mythological scripts. Grains, farm products vital for life are damaged on Massive scale by pests. There are two main crops being grown in India. Kharif and Rabi. The first starts from last week of June and lasts upto first week of October and the latter starts from third week of October and lasts upto April. The interim period falls in the month of Kartik by Hindu calander. The festival of Dipawali is celebrated In this month on Amavasya i.e. on no moon night. At this time the Kharif harvesting is over and Rabi sowing starts. So by the effect of ploughing all the field insects leave their natural places of dwelling. On that night countless light traps glitter all over India. All the positive phototropic insects fall in these lamps and die. I myself collected five different orders of insects from one lamp. The maximum number of insects collected from one lamp were 197 and minimum were 11 out of 100 lamps.

In entomological term one can say that the festival of Dipawali is nothing but to attract all the positive phototropic insects on light traps on one no moon night on mass scale to kill them.

Birds

Manu, who is supposed to be the most ancient Rishi in India has written in his book Manu Sanghita "Jiwa Jivasya bhojanum" i.e. life lives on life. With this theory the ancient people conducted so many experiments on biological control of insects. They called so many birds. as sacred and prohibited people not to kill them. For example many field crops are being distroyed by nocturnal insects. Owls and bats are two predominent nocturnal birds and carnivorous mammals which feed themselves with pests during night. Bats are supposed to be dear to the goddess of wealth, Lakshmi, while owls are considered the chariot of Lakshmi because they prey on pests apart from small mammals like field-mice.

Sparrows also depend on pests and are supposed to be holy as the caste Brahmins in India. Sparrow's contribution towards natural and integrated pest control had also been realised of late by China. By legislation 1956, China declared sparrows harmful to crops and forced her citizens to exterminate them en mass to supplement her food scarcity prevailing then there. Innumberable sparrows were, therefore, killed in China during the year 1957-59. This caused a total disappearance of sparrows from fields of China and later followed an uncontrolled and enormous breeding of insects. The Chinese Government, ultimately was forced to undertake spraying thousand and thousand tons & insecticides to control pest depredations to crops.

Lizards and Snakes

Lizard eats insects flying around the light. Hindus had to perform the ritual of 'Namakadan,' salt donation, if lizard happened to fall from the celling or tree on human body so that nobody will kill them and they will go on eating insects freely.

'Dhamin; a kind of fast running snake, and Paniyara water snake, are non-poisonous and eat insects. Hindus offer 'Puja' to snakes on the 'Nag panchmi' day in the month of Shravana (Hindu calander). This is done apparently to prohibit farmers from killing snakes even if they arrive in residential areas during monsoon. On this day, people perform 'Nagpuja' by offering milkpots and parched grains. In Sanskrit, snake is called 'Kestrapal', area gaurd for its instinctive quality of protecting crops from damages caused by pests. To remove fear from the minds of people the Rishies adorned the neck of Lord Shiva with snakes and Lord Vishnu is using snake as bed.

Cats

Rats, which cause great annual loss to farmers are eaten by cats. The killing of cats is considered to be a sin from which one could get rid of only by donating gold equal to weight of the cat. Provision for death sentence for killing a cat is reported to have been made under a law prevalent in ancient England.

Forecasting

1. Effect of Planets

The Indian astrologers had fixed the order of the twelve constellations of the Zodiac in accordance with the effect of planets on crop.

Bhaddari, renowed ancient agriculturist and poet, whose saying in couplets pertaining to the art and science of farming are of immence value in agriculture, had studied the effects of planets on cultivation.

For emample, one couplet .....

"Karak bove kankare, Sinha aabone jaya

Asia bole Bhaddari, kida phir phir khaya"

Warns that if cucumber is sown during the period of Cancer and there is no sowing during the period of Leo, pests would distroy the crop.

2. Effects of cold

They studied the effect of cold on gram crop.

For example.....

"Chana me sardi bahut samai
Tako jan gadhaila khai".

Means if too much cold will inter in Gram crop then one should understand that it will be attacked by Heliothis sp.

(*Contd. on page* 24)

Main Diseases of Poultry Birds

Diseases often cause heavy losses in poultry flocks. These losses may occur directly in the form of heavy mortality or indirectly in the form of lowered vitality and decreased yield. So you have to take steps to keep diseases off your flock.

Take the following precautions :

(1) Purchase chicks only from a known source, from a healthy flock which is free from all disease infections notably pullorum, fowl cholera, chronic respiratory disease and Avian leucosis complex. Do not allow grown-up fowls from any other source into your union.

(2) Rear the young stock away from adult birds. Keep separate attendants and equipment for young chickens and old birds.

(3) Avoid overcrowding as it causes many diseases among the birds.

(4) Maintain sanitary conditions in your unit. Do not allow poultry manure or trash to accumulate near the house.

(5) Dispose of dead birds by burning or burying them deep in the ground.

(6) Control insects such as flies, mosquitoes, cockroaches, ticks, mites, fleas, lice, etc.

(7) Vaccinate your chicks according to the following schedule. Ensure that all the chicks are vaccinated in one lot.

(a) Day-old chicks; Vaccinate the chicks against Ranikhet disease, using 'F stain vaccine.

(b) At three weeks : Vaccinate against fowl pox, using pigeon scab virus vaccine.

(c) At seven weeks : Vaccinate against the Ranikhet disease, using the regular freeze-dried chick embryo vaccine.

(d) At nine weeks; Vaccinate against fowl pox, using fowl pox virus vaccine.

(8) Do not allow visitors indiscrimately into the poultry house. Keep a vessel full of phenyl lotion outside the gate of the poultry house. All persons entering the house should dip the soles of their shoes in the lotion.

(9) Closely observe the health of your chickens daily. Immediately isolate those showing symptoms of any disease and take prompt control measures.

When using proprietory preparations, follow the instructions of the manufacturers in the matter of dosage, method of use, etc.

The symptoms of the common diseases of poultry, their treatment and control measures are given below.

Puliforum

This disease is caused by a bacterium called Salmonalla pullorum. It is an egg-borne disease. The germs of the disease pass through the egg and infect its chick and also other chicks haching in the same incubator. Both young chicks and adult fowls are affected by this disease.

Symptoms in chicks :

(1) Death of many chicks soon after hatching.

(2) General unthriftiness and huddling together of chicks.

(3) Whitish or brownish diarrhoea.

(4) Pasting of the vent with droppings.

(5) Laboured and irregular breathing.

(6) Reduced appetite, but increased thirst.

(7) The chicks make a squeaky chirping sound, as if in pain.

(8) Lameness, in chronic cases.

Symptoms in adult fowls :

(1) Depression, weekness and listlessness.

(2) Ruffled feathers.

(3) Droopy head and wings.

(4) Pale comb and wattles.

(5) Greenish brown diarrhoea.

On opening the abdomen, the ovary is seen to have grossly misshapened yolks, filled with golden yellow oily material. It shows a rather crooked appearance instead of round and spherical yolk in a normal ovary.

Hens that have recovered carry the germs of the disease in their ovaries.

Control measures :

(1) Purchase your chicks only from stocks which have been duly blood-tested and certified to be free from pullorum infection. Don't purchase chicks from a hatchery where eggs from untested flocks are also hatched.

(2) Medicate the affected lot of chickens with furazolidone 0.04 per cent in the mash.

(3) Keep the brooder house warm.

Coccidiosis

Coccidiosis is a serious disease, and is of very common occurence. Hardly any flock is free from this disease. It is caused by protozoan parasites called Coccidia which invade the intestines.

The affected chickens pass the germs in their droppings which infect the floor, litter, feed, water equipment, etc. These germs become inefective in 24 to 72 hours. Other chickens in the house pick them up and get the disease. Moist and warm

Birbhumi Tops

Birbhumi district in West Bengal has set up a new record in acreage under high yielding variety of wheat. Out of 85,000 acres under wheat were in the current rabi season 72,000 acres are under high yielding varieties.

conditions favour to growth of these germs and the spread of infection. Chickens which have recovered from an attack may carry the germs in their intestines and remain a source of danger to other chickens.

There are two types of the disease: caeacal and intestinal.

Caecal coccidiosis usually occurs in chickens which are 3 to 10 weeks old. Its symptoms are :

(1) Loose droppings, containing blood.
(2) Pale comb and wattles.
(3) Ruffled feathers, and droopy appearance.
(4) Affected birds huddle together, with eyes closed.
(5) Lameness and dropped wings.
(6) High mortality.

On opening the abdomen, the caeca or the blind guts are found to be enlarged and filled with blood.

Intestinal coccidiosis usually occurs in chickens 6 to 24 weeks old. Its symptoms are :

(1) Slow and prolonged course of the disease.
(2) Diarrhoea. but no blood in the droppings.
(3) Debility and loss of condition.
(4) Pale comb and wattles.
(5) Weakness of legs.
(6) Low mortality, but high losses due to poor condition of the birds.

On opening the abdomen, the upper portion of the intestines (duodenum) is found to be thickened and inflammed. Small haemorrhages and clots of blood may be found there.

Control measures :

(1) Maintain proper temperature in the brooder house.
(2) Keep the litter and house dry.
(3) Place the water vessels on wire platforms.
(4) Clean and disinfect the poultry house and equipment properly.
(5) Avoid overcrowding.
(6) Medicate the affected chickens with any one of the following drugs :
   (i) Sodium sulphaquinoxaline 0.04 per cent in drinking water, or 0.05 per cent in the mash, for four days.
   (ii) Sodium sulphamezathene 0.2 per cent in drinking water for five days.
   (iii) Nitrofurazone 0.011 per cent in drinking water for seven days.

Infectious Coryza

The chickens affected by infections at coryza first show watery discharge from the nose and eyes. The eyes become red due to inflammation of the conjunctiva. In a few days the discharge becomes thick. The nostrils get closed and the eye-lids glued together. The birds begin to breathe through their mouth. They also sneeze to clear their nostrils.

Cheesy pus accumulates under the eyelids. If the birds are left untreated, one or both the eyes may be destroyed. The face may get swollen due to inflammation of the sinuses. Egg production declines in laying hens.

Contol measures :

Isolate the affected chickens.

In the early stages of the disease, wash the inflammed eyes with boric lotion (1 gram of boric acid in 40 cubic centimetres of water).

Give the bird medicated mash prepared by mixing 5 grams of sulphtthiazole in 1 kilogram of mash. Do not give any other mass grain to affected chickens. Continue the treatment for five days.

If the disease still persists, inject intramuscularly 200 mg. streptomycin dissolved in 1 c.c. of distilled water.

Avoid overcrowding, and provide enough ventilation. Avoid exposure to rains and intense heat or cold,

Increase the amount of vitamin A to 4.4 grams in 100 kilograms of mash. Give fresh, succulent greens to the chickens.

Ranikhet (new castle)

Ranikhet is a very serious disease which causes heavy losses. It is caused by a virus. Treatment of affected chickens is not effective. Hence take preventive measures.

Symptoms :

(1) Quick onset of serious illness in a large number of chickens.
(2) Difficult breathing, with stretched neck and open mouth.
(3) Diarrhoea.
(4) Nervous symptoms such as twiching movement of the head, neck and limbs, and paralysis.
(5) Death within a day or two. High mortality. The post-mortem reveals small pinpoint bleeding spots in the preventriculus or glandular stomach.

Preventive measures :

Carry out the following vaccination programme on your poultry farm, as a routine.

(a) Vaccinate day-old chicks with 'F' strain vaccine.
(b) Repeat vaccination when the chicks are six to eight weeks old, using the regular freezedried chickembryo vaccine. This gives life-long protection against the disease. Do not mix vaccinated chickens with unvaccinated ones.

The vaccines are available at the Indian Veterinary Resea.ch Institute, Izatnagar (Uttar Pradesh), and also at the Biological Institutes of some States.

Contact the Poultry Development Officer of your state, the Block Development Officer of your Block, or the nearest veterinary hospital for getting your chickens vaccinated.

Fowl Pox

Fowl pox causes heavy mortality in young chicks. It is caused by a virus which invades the mucous membranes of the mouth, eyes and the skin.

It occurs in two forms : (1) the skin form and (2) the diptheritic or throat from. The sympoms in the skin form are as follows :

(1) Small blisters on the comb, wattles and skin of the head, which soon dry up into brownish scabs.
(2) Sores and scabs on the feet and legs, around the vent and under the wings.
(2) In severe attacks, appetite is lost and the birds lose weight, and become listless. Egg production goes down.

The following are the symptoms in the diptheritic or throat form.

(1) Yellowish, raised membranous patches in the throat, mouth or corners of the beak, which cannot be removed easily, and on removal leave a raw bleeding surface.

(2) Interference in breathing.
(2) Interference in eating, resulting in general weakness.
(4) Discharge from the eyes.
(5) Bulging of eyes due to the accumulation of eheesy yellow pus.

Control measures :

Protect the flock by vaccination, using the following vaccines :

(a) Pigeon pox virus vaccine in young chickens (less than six weeks old) and birds in lay.
(b) Fowl pox virus vaccine in older chickens. Do not mix vaccinated birds with unvaccinated ones.

Spirochaetosis or Tick Fever

Tick fever is caused by a long, wavy, screw-like organism called Spirochaeta gallinarum, which invades the blood stream and internal organs.

It is serious disease of fowls. Infection takes place through the bite of ticks and mites.

Symptioms :

(1) Fever.
(2) Diarrhoea.
(3) Loss of appetite.
(4) Sleepiness.
(5) Pale comb and wattles.
(6) Ruffled feathers.
(7) Dropped wings.
(8) Paralysis, in later stages.

On opening the abdomen, the spleen and liver are found to be enlarged.

The diagnosis can be confirme by microscopical examination, by seeing the causative organism in the blood of the affected chickens.

Control measures :

(1) Eradicate ticks. Look for seed ticks on the body of the birds specially under the wings, and for ticks in the crevices in the house and on the equipment.
(2) Inject interamuscularly pencillin 10,000 to 20,000 units or sulfarsenol 0 015 to 0.02 grams in aquous solution.

Fowl Cholera

Fowl cholera occurs in acute and chronic forms. Fat birds are more susceptible. In the acute form the symptoms are :

(1) Sudden death, without any visible symptoms.
(2) Greenish or yellowish diarrhoea.
(3) Fever.
(4) Rapid and noisy breathing.

Treatment

Treat the affected chickens with any one of the following drugs :

(n) Sodium sulphamezathene 0.2 per cent in drinking water for five to seven days.
(b) Sodium sulphaqninoxaline 0.04 per cent in drinking water for four days:
(c) Oxytetracycline 500 grams per ton of the mash for a week.
(d) Chlorteracycline 40 mg. per kilogram of bodyweight intramuscularly.

Chronic Respiratory Disease

The symptoms of the Chronic Respiratory Disease are : nasal discharge, coughing, sneezing and noisy breathing. The affected chickens lose condition and their growth is retarded. In laying hens, egg production is reduced.

If you cut open an affected chicken, you will find the trachea and bronchi inflammed and containing mucous discharge. The air sacs contain cheese-like material and give a beaded appearance.

The infection spreads through air sacs contact with infected birds. In the case of laying hens, it also passes through the eggs.

Control measures :

(1) Avoid overcrowding and damp conditions in the poultry house.
(2) Provide ample ventilation, and protect the birds from exposure to rains, intense cold or heat.
(3) Give intramuscular injection of streptomycin with dihydrostreptomycin at 25 mgm. per kilogram of body-weight at two days' interval between two injections.
(4) Get the carrier birds in the breeding stock identified by serological tests, and give them intramuscular injections of 200 mgm. of streptomycin at monthly intervals.
(5) Fortify the mash given to the affected flock, with broad spectrum antibiotics like auromycin or terramycine at 200 to 400 mgm. per ton of the feed. Feed a weil-balanced ration. Add vitamin A at the rate of 4.4 grams per 100 kilogram of the mash, and give fresh succulent greens to the birds.

Avian Leucosis Complex

It is a common disease of poultry and is of a complex nature, It is believed to be caused by more than one virus. No effective treatment is known. The remedy lies in purchasing chicks from a flock which is resistant to the disease.

There are many types of the disease. Its symptoms in the various forms are as given below.

(a) *Nerve type (Fowl paralysis)*

Paralysis of the affected part or parts, resulting in one or more of the following symptoms ;

(1) Drooping of wings.
(2) Lameness.
(3) Inability to raise the beak from the ground, or twitching of the head.
(4) Jerking and twitching of the affected limbs.
(5) Difficult breathing-
(6) Flaccid crop and diarrhoea.
(7) Soiled fronts. The feathers under the mouth become damp, darkened and discoloured, due to flow of saliva from the corners of the mouth.
(8) Shrinking of muscles of the affected part.

(b) *Eye type* (*White eye*) :

(1) White or grey colour of the iris.
(2) Bulging of the eye.
(3) Impairment of vision, leading to complete blindness.

In severe cases, the pupil remains fixed, and does not contract and dilate with changes in the intensiy of light.

(c) *Visceral type* :

(1) Greyish pink or yellowish tumours of varying sizes in any organ or tissue such as liver, spleen, gizzard, pancreas, mesentery, intestines, ovaries testes, lungs, heart, muscles and skins.
(2) Diarrhoea.

(d) *Bone trpe* (*Marble bone*) :

(1) Thickened and misshapened bones of the legs
(2) Cautious, jerky gait.

(e) *Blood type* (*Big liver disease*) :

(1) Pale or yellow comb and wattles,
(2) Rapid loss of weight.
(3) Liver enlarged to an enormous size, soft and flabby in consistency and greyish red in colour.
(4) Diarrhoea.
(5) Spleen very much enlarged, and flabby and pulpy in consistency.
(6) Bone marrow becoming brick red in colour.
(7) Swollen kidneys.

Bittergourd Growing Profitable

(*Contd from page* 8)

rainy season. The seeds may also be sown in furrows or on ridges with the same distance in between the rows. The plant to plant distance may be about 80 to 90 cm. in summer and 120 cm. in rainy season and at one place three to four seeds may be sown and later on they may be thinned out to two to three seedlings at one place. In some places 90 to 120 cm. wide raised beds are prepared with 45 to 50 cm wide irrigation furrows in between the beds. The seeds are sown on both the sides of the edges of the broad ridge at 90 cm distance at a depth of 20 cm. The seed rate is about 5 to 6 kg/ha in rainy season and 7-8 kg/ha in summer season. Before sowing the seeds in the fields, seed may be soaked for about 24 hours in water, in order to soomthen the hard seed-coat of bittergourd. Otherwise, because of hard seed coat, it takes long time to germinate.

Inter-culture and Irrigation :

One or two hand-weeding should be done which also helps to pulverize the soil and increase the aeration of the soil.

The rainy season crop is normally raised under rainfed conditions, but when irrigational facilities are available 3-4 irrigations are applied from September to November so as to obtain heavy fruiting. The summer season crop is exclusively raised with irrigation. The crop should be irrigated at an interval of 5-6 days depending on the type of soil.

Harvesting and yield :

The June-July planted crop starts to give fruits from September to November. The summer season planted crop starts to give fruits 70-75 days after sowing and continues upto the beginning of the rainy season The young and tender fruits should be picked up. The fruits may be picked up at an interval of 4 to 5 days depending on the intensity of the fruiting. When the fruits are not picked up in time, they become unmarketable and the yield and price in the market are reduced. On an average the rainy season crop gives about 150 to 175 q/ha of fruits and the summer season crop gives about 90-120 q/ha of fruits. Although the yield of summer crop is comparatively low the profit per/ha may be more, because of high price of bittergourd in summer season.

Progress in Animal Sciences' Research

(*Contd. from page* 7)

are used as a routine is the various livestock improvement programme.

The serveral problems cannected with livestock production, whether pertaining to breeding, feeding, management and control of diseases require to be tackled in a comprehensive and intensive manner. The Indian Council of Agricultural Research proposes to launch an attack on these problems through coordinated research projects.

These projects cover the important species of livestock kept for agricultural purposes-cattle and buffaloes for milk, sheep for mutton and wool and goats for milk, meat or pashmina, poultry for eggs and meat. It ls hoped that through the efforts of the reserrch iustitutes and the co-ordinated research projects, it would be possible to provide suitable answers to the field problems of livestock productson.

Strong support through coordinated research would hasten the progress in livestock production programmes and help to make available more nutritious food for the vast population of the country.

Chemicals to Aid Mechanical Harvest

Mechanical tree Shakers will knock fruit off trees but not as easily as growers would like. It is just possible that the force applied to Shake the fruit trees may bruise fruits or injure trees.

An American Horticulturist Mr. Martin J. Bukovac has been testing a chemical, 2 Chlorrethyl Phosphenic acid, which causes—the fruit to separate from the stem at maturity.

Five days after application as a foliar Spray, the Chemical has reduced by about 35% the shaking force necessary to remove fruit and by 65% after ten days. But its application has one drawback. If the tree is not vigorous the chemical may cause defoliation and may affect productivity adversely.

In similar research at the University of California they have Synthesized a plant harmone termed as "Abacisin II" which also accelerates the separation of fruits and vegetable from plants. Scientists think the chemical could help adopt tomatoes to once over mechanical harvest. At different dosage, Abscisin II and other experimental abscisin accelerators" may also be useful as growth regulators or defoliants.

In Thanjavur They Dry Paddy Mechanically

When the cement and concrete structures dotted the rural landscape in Thanjavur district in Tamilnadu, the farmers had one of their vexing problems solved—getting paddy dried even in pouring rains.

For, in Tanjavur the *Kuruvai* paddy harvest in September-October coincides with the north-east monsoon.

The new structures put up by the Food Corporation of India in 1967, at 30 centres are the modern paddy driers each one having a capacity of drying 160 tonnes of paddy every day.

Granary of Tamilnadu

Thanjavur's agricultural prosperity dates back to the second century A.D. when the land was 'flowing with milk and honey' under the reign of the Chola Kings. It was Karikalachola, the greatest among them who conceived and built the famous Grand Anicut across the Kaveri river which facilitated irrigation of long stretches of flat paddy lands in the Thanjavur delta. Though the Grand Anicut was rebuilt during the last century, it is still considered a symbol of the deep love a benevolent ruler of ancient days had for his people.

Today out of 18.8 lakh acres of paddy lands in the district, a little less than 15 lakh acres are under irrigation.

Known as the granary of Tamilnadu, Thanjavur district in recent years has made giant strides in paddy production. The recent introduction of the high-yielding, short duration variety of dwarf paddy, ADT-27, evolved at the agricultural research station at Aduthurai, is yet another milestone in the agricultural prosperity of the region.

The new strain ADT-27 however, suffers from a major drawback. Its grains when mature sprout under wet weather. As the first crop harvest in Thanjavur takes place invlariably in wet weather the risk of heavy loss to the crop became the concern of those involved in the conversion programme.

How to overcome this hurdle was the question of the hour. The answer lay in establishing modern driers which could dry paddy irrespective of the vicissitudes of the weather.

Mechanical Drying—its Advantages

Mechanical drying of paddy, practised in industrially advanced countries, has many advantages. The main one, of course, is that paddy can be dried even when the season is wet. For drying paddy in the sun, the crop has to be harvested when it is fully mature which would mean some shedding of grains in the field and consequent loss. It also causes sprouting of grains possessing little dormancy. Under mechanical drying, paddy can be harvested even before it is fully ripe. Another advantage of mechanical drying is that due to uniform heating in the driers, paddy can be milled with little broken rice. Moreover unlike in sun drying, where there is always some loss due to birds and rodents, mechanical drying keeps count of every grain put in the drier.

Mechanical drying is done by passing hot air through the paddy. The process of drying starts from measuring the moisture of paddy and then passing it through a hopper to a 'scalper' where it is cleaned. The cleaned paddy is then taken to a drier where the moisture is brought down to 19 per cent. Afterwards, the paddy is held in a metal bin for 8 hours for 'curing' and the process of drying and 'curing' is continued till the moisture is brought down to 14 per cent. The paddy is then taken into the godowns where it is bagged, weighed and disposed of. The efficiency of the operation makes it possible to dry paddy on schedule and ensures its continuous flow to the rice mills.

The Thanjavur venture underlines the possibility of extending the mechanical drying project to other 'rice pockets' in the country.

New Growth Regulators To Boost Agricultural Yields

New chemical changes the way plants grow-help you regulate crops to get the highest possible return in any given season.

You can make seeds sprout sooner, help plants resist frost or drouth or make them less attractive to pests.

And depending on the timing and type of chemical you use, treated crops will set more seed, accumulate more protein or oil, lodge less or even change size and shape for easier, faster harvest.

These new growth regulators, many scarcely more than a scientific curiosity up to now, are starting to move into farms for use in major crops. Last year, almost 100 farmers in five states tried Regim-8 (formerly called Tiba) and reported yield increases up to 15%. The chemical is undergoing even wider farm tests this year and has already been cleared for use on northern soybeans grown for seed.

Plant Changing Chemicals

"It could be the first of a whole new series of plant-changing chemicals that will boost yield in major U.S. crops", says Tom Army, scientist at International Minerals and Chemical-Corp.

Around the country, nurserymen are probably several years ahead of most of farmers in putting growth regulators to practical use. They are using the new sprays such as American Cyanamid's Cycocel, Mobil's Phosfon and Uniroyal's B—Nine to produce compact leaf growth in shrubs and to get shorter stems and more flowers on ornamental plants.

Field Testing

"We think that growth regulators are as important as fertilizers on some plants," says Charles Fischer, Atlantic county, N.J., nurseryman. "Azaleas, poinsettias and charysanthemums, for example growth regulators keep them compact—at just the right height to be attractive."

Fischer puts B-Nine on mums, petunias and hydrangeas; sprays Cycocell on azaleas and poinsettias.

European farmers are already using about 1 million pounds of Cycocel a year to prevent lodging in high-yielding, heavily fertilized fields of wheat. In California tests this year, it increased wheat yields by as much as 28%, barley yields by 35%. Cycocel also shows promise on food crops such as tomatoes and peppers.

New Researches

Similar chemicals are under development by other manufacturers. They are testing a new growth regulator coded 66329 that produces a bigger harvest of apples, pineapples, olives, citrus fruit and wheat.

"Moisture Miser" sprays that help plants withstand short-term drouth during critical stages of growth are under test by International Minerals & Chemicals corp., and a number of companies are testing chemicals that cause seeds to sprout early at lower-than.normal temperatures.

Some chemicals, already paying off as weed sprays, also show promise as growth regulators. For example, Simazine boosted protein by 25% to 80% in several feed, food and forage crops in Michigan State University tests.

More than Regulators

Scientists are coming up with new jobs for growth regulators, too. Neil Stuart, USDA scientist at Beltsville, Md., is using chemicals to bring plants out of dormancy, resist transplanting shock and to do selective pruning-kill certain types of buds while leaving others alive on the same plants.

Says John Mitchell, co-ordinator of basic growth regulator research at Bolisville: "Many fruits and vegetables are rapidly becoming too expensive to hand pick at current wage rates. So We are looking for chemicals that will drop fruits over a short period, at exactly the right time, And we are spraying to alter the shape and maturity of vegetable plants so that the entire crop can be picked by machine in single trip over the field."

The idea of directly controlling crop growth with chemicals isn't new. Tobacco farmers have been using maleic hydrazide to inhibit suckers on plants for more than a decade. For almost as long, potato growers have controlled sprouting in bins with maleic hydrazide or carbamates. And growers of Thompson seedless grapes have been boosting yields with gibberellin plant hormones for about 10 years. Gibberllin has just been okayed for use on sveral more crops.

Regulators becoming popular

So far, over 40 growth regulators have been registered for more than 100 uses, with some chemicals controlling plant growth in more than one way, depending on time and type of application.

The most recent U.S. registration granted in July, is for use of Uniroyal's Alar 85 on apples and grapes. The chemical already has similar clearances in Canada, England and Holland.

On apples, scientists say that Alar cuts tree height and also causes trees to start bearing in four to five years instead of seven or eight.

"Apple trees treated with Alar show a variety of desirable responses," says A.W. Mitlehner, Uniroual's product manager for growth regulants.

"Plant reaction depends partly on timing," he explains. "When we apply the chemical to apple trees shortly after full bloom, we get a reduction the current in season s vegetative growth and increase in bloom the following spring."

Experiments with various results

When Alar is applied 45 to 60 days before normal harvest date, there is little or no effect on vegetative or flowering growth but apples remain on the tree longer, maintain their firmness and are often more highly colored.

"Peaches and cherries also mature earlier and harvest is concentrated

(*Contd. on page* 24)

News from State Samajs

Hariyana Krishak Samaj

Gurgaon Executive Passes Resolutions

A meeting of executive committee of Gurgoan krishak Samaj was held on 15th of April 1969. under the Presidentship of. Ch. Attar Singh and passed following resolutions:—

1, Since 1964, in Gurgaon Distt the Govt. has been acquring agricultural land in bits under the master Plan and the farmers are being paid very small price, which can neither be utilised for purchase of land nor for starting any occupation and is thus wasted. It is, therefore requested that the total land required by Govt. Should be acquired at one time and the compensation be also paid in lump-sum so that the farmers may purchase land at other places.

2. At the time of acquisition of land, the price fixed as award is very little & the farmers to get redress have to resort civil courts & the compensation money is thus spent in litigation. As Far example in Sector 15 & 16 at Faridabad, price was fixed by Govt. At Rs.1/-or 1/4 -per Sq, Yd. while the civil courts decreed at Rs. 16/- per sq. yard. Moreover the Govt. after converting the land into plots, was selling at Rs 35/-per sq. yd. The farmer should therefore, be given proper market value of the land.

3. Govt. is acquiring land in Sectors 15 A& 16A. The price of this land has been steadily rising from 1960 & has gone upto Rs. 15/- per sq. yd. The Govt. had acquired some land in 1963 for Canal Colony & fixed its price at -/14/- per sq. Yard but the Civil Court raised it to Rs. 9/- per Sq. Yard.

The Hon'ble Chief Minster, Haryana is, therefore, requested that proper market value of the land acquired should be announced at the time of giving award, keeping all these facts in view. The farmers thus be saved from litigation & harassment.

5. In view of high prices of inputs, required for cultivation of food grains crops, particularly, wheat the procurement prices of wheat should be Rs. 90/-per Qtl. for ambre coloured mexican as well as desi varieties.

6. Levy of wealth tax on agricultural land is deterimental to the farmers. It should not be imposed.

Mysore

Farmers Convention & Rural Youth Festival

Mysore Krishak Samaj and State Young Farmers Association organised a State Farmers Convention., Young farmers Rally and Youth Festival.

The two days State Farmer's Convention was inaugurated on 12th of April, 1969. Young Farmers Rally and Youth Festival were held from 15th to 17th April, 1969. An Agro-Industrial Exhibition was also organised to the benefit of farmers of the State.

A Seminar on the role of farmers and financing agencies in increasing agricultural production was also organised, in whlch different problems and difficulties faced by the farmers of the State were discussed.

About three thousand farmers and an equal number of young farmers took part in the Convention and the Youth Rally.

Kolhapur

Farmers Training Camp

A farmers training camp was organised by the Kolhapur Krishak Samaj in the Village Yevluj, Panchala Taluka. Which was inaugurated on 5th of March 1969 by the Chief Executive Officer Kolhapur zila parishad Shri Shared Kale.

Principals of Agriculture College and Gram Sewak Training Centre

Urea for Cotton

Urea as a fertillizer will give as good results as ammonium sulphate with cotton, and better, if the fertilizer is applied at sowing time. This was found out recently at the Cotton Research Station, Bhawanisagar Madras.

It was also seen at the station that urea could as well be applied as spray on the foilage. With Urea, is no risk of leaf scortch. At the same time the spray can be combined efficiently with pesticides. This reduces the cost of spraying.

If cotton farmers were to use urea instead of ammonium sulphate, they would save considerably on the fertilizers. In Madras alone Rs. 13 million can be saved by using urea.

extended their Cooperation ln makeing the camp a success.

Practical training and know how demonstrations were conducted to the benefit of farmers and visits to farms were arranged, lectures by experts and social workers on differrent problems pertaning to agriculture were a speciality.

The training camp concluded on 11th March. Concluding ceremoney was parformed by Dy. Chief Executive Officer Shri Sindhu.

Delhi

Farmers Training Camps

The Delhi Krishak Samaj is organising training camps for popularising new methods of cultivation and use of high-byrid seeds and fertilisers etc. The practical demonstration on the fieids of progressive farmers also given.

A training camp on the farm of Ch. Risal Singh, Chairman Block Development Committee, Najafgrah, at village Samapur was held in last week of March 1969, The Camp was inangurated by Ch. Karan Singh, Secretary of the Delhi Krishak Samaj. The Camp concluded with talk by Shri Shive Narain Sarunia, Executive Councillor. In the seven days camp. thirty selected farmers were oriented in the use of pesticides and insecticides for protecting the crops, selection of seeds, use of fertilisers green manure, new implements and other farm practices. The fraining also provided in subsidiary occupations like poultry, animal husbandry, gardening. orchards and in cottage industries,

The Krishak Samaj has drawn a programme of organising such camps in all the five blocks in the coming year. It will also take progressive farmers on a tour of Bharat Darshan.

DR. BHOLAY BECOMES VICE PRESIDENT OF YFA.

The President of Young Farmers Association, India has nominated Dr. D. A. Bholay as one of the Vice-Presidents of Young Farmers Associacion, India. Dr. Bholay is now the Executive Vice-President of the Association.

TENTH NATIONAL CONVENTION OF YOUNG FARMERS

The Tenth National Convention of Young Farmers Association, India, is scheduled to be held at Bombay from 3rd to 5th May, 1969 The Convention is synchronising with the holding of the 5th National Agriculture Fair organised by the Bharat Kriseak Samaj to enable the delegates to Convention to visit the Fair at Bombay.

During the three day Convention a one day Seminar will be organised by the Asscoiation to discus immediate problems confronting the rural youth in their progress and the role of young farmers in incresaing agricultural production in the country. Subject matter specialsts and Youth leaders are iuvited to help in the deliberations. The following will be the tentative programme of the Convention.

TENTATIVE PROGRAMME OF CONVENTION

May 3, 1969 (Saturday)	Forenoon	Registration of delegates,
	4.00 p.m. to 7.00 p.m.	Inauguration of the Convention, Report of the Secretary, Y. F. A. India, Announcement of subject for discussion.
May 4, 1969 (Sunday)	9.30 a.m. to 12.30	Seminar.
	2.30 p.m. to 4.30 p.m.	Meeting continues; speeches of experts.
	5.00 p-m.	Visit to the Fair.
May 5, 1969 (Mondy)	9.30 a.m. to 12.30	Plenary Session-Consideration of Committee report.
	Afternoon	Free.

Integrated Pest . . .

(*Contd. from page* 16)

3. Effect of Wind

They also studied the effect of different directions of wind on crops. For example.....

(i) "Magh poush bahai purwai
Tab Sarson kae mahu khai".

Means if wind will blow from East in Magh and poush month (Hindu calander) then the Mustard crop will be attacked by Aphids.

(ii) "Pachuwa hava osaway Joee".
Ghagh kahai na kabahun
Chun hoi".

Ghagh, a renowned ancient agriculturist and poet, saying that if anybody winnows his crops when wind is blowing from west then his grains will be never attacked by Stored grains pests.

. . . Growth Regulators

(*Contd. from page* 22)

into a short period just what growers need for mechanical harvest," says Mitlehner. "In peanuts, Alar holds back vegetative growth so planting rate can be stepped up. Yields increase by as much as 25%."

Regim-8, the Soybean that farmers are field testing, holds down the size of plants, but they set more pods,

"We combined more than 58 bu. acre where we sprayed ; 53 where we didn't, 'says Gordon Bennett, Macon County. 11.

Timing of the spray is the key to top yields, beleives Gibson Gray, Shelby County, Ind.

"We sprayed Wayne Soybeans when they first started to bloom and got an 11% increase, "says Gray.

Ted Sherbeck, young farmer in Guster County, Neb., agrees. "You broadcast the spray, and the size of the plant-determines how much chemical it takes in." explains Sherbek, whose research with growth regulators won him a Ph. D. at Indiana's Purdue University.

His yields jnmped 8 bu. per acre-from 47 bu. to 55 bu. where he sprayed irrigated Amsoys in 30" rows. The plants set more pods and matured one to three days, sooneer, even in dryland beans.

"But the biggcst benefit was the way the beans stood up at harvest", says Sherbeck

Shri Jagjivan Ram, President of the Bharat Krishak Samaj and Union Minister, Food & Agriculture standing after garlanding the Statue of Late Dr. Panjabrao Deshmukh, the founder President of Bharat Krishak Samaj with Dr. D. A. Bholay, Secretary, Bharat Krishak Samaj and Director General of the Fair.

Regd. No. 1092

Now in Full Swing

In Bombay

Fifth National Agriculture Fair

at Mahim Creek, Bandra

with

EDUCATIVE AND ATTRACTIVE

PAVILIONS

DISPLAYING

MODERN AGRICULTURAL EQUIPMENTS

IMPROVED SEEDS, PESTICIDES, INSECTICIDES

FERTILISERS AND EVERYTHING SCIENTIFIC

Thousands Visiting the Fair Daily

Why Not You?

Published and Edited by Dr. D.A. Bholay for the Bharat Krishak Samaj, A-1 Nizamuddin West, New Delhi-13. Printed at Everest Press, 4 Chamelian Road, Delhi-6