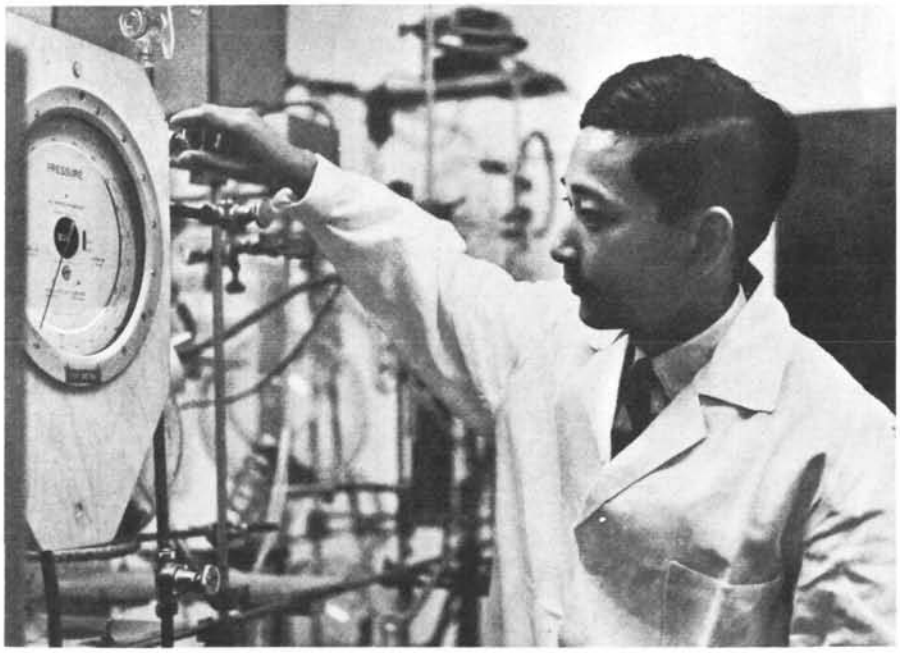
BIGGER AND EARLIER CROPS THROUGH RADIATION

Radiation-induced mutations in plants have already brought significant improvements to strains of cereal crops which are of great importance to the world's food supplies. In the early part of 1966, meetings of scientists involved in IAEA co-ordinated programmes of research in this field revealed considerable practical achievement in the improvement of such important crops as rice and barley, as well as great scope for future progress.

These meetings, dealing with the use of radiation and radiomimetic substances in plant breeding, were held as part of internationally co-ordinated research programmes sponsored by the Agency.

Scientists cooperating under an FAO/IAEA Co-ordinated Programme of Research on the Production and Use of Induced Mutations in Plant Breeding, other invited experts and representatives of other international organisations, met in Vienna from 17 to 21 January to report on their scientific research under the programme and to recommend steps for co-ordinating their research activities. The 16 scientists from 11 countries participating in the programme - who represent some of the most outstanding workers in the field - co-operate under so-called "cost-free" research (co-operation) agreements with IAEA. This is the first group of scientists to co-operate in this way under an international programme without cost to the Agency.

Mr. Wunlop Boonkong of Thailand, an IAEA Fellow, at work in the Agency's Seibersdorf laboratories.



At this panel meeting, it was strongly brought out that induced mutations had become an important tool in the breeding of some major crop plants. Sweden, for example, reported that radiation-induced mutants were now used in about 60 per cent of all barley breeding material in Sweden, and that the Swedish mutant material was being used in many other breeding programmes, particularly in Europe. The use of induced mutants showing improvement in straw strength, earliness and higher yield had already raised barley breeding in Sweden to a higher level.

The panel concentrated on identifying major technical problems, solulution of which would help clear the way for the production and use of induced mutations. At the same time, it outlined methods of approach for solving these problems.

The panel members agreed to cooperate in preparing a manual describing efficient techniques used in mutation research, and summarising the latest information on induced mutations in major crop plants. The participants in the co-ordinated research programme also agreed to act as an informal advisory group for the international programmes and projects of the Joint FAO/IAEA Division, in the field of plant breeding and genetics. While commending the work of the Agency's Seibersdorf laboratory (a section of which is engaged in research in plant mutation), the meeting also stressed the need to develop further an international laboratory, and outlined several fields of research which should be dealt with by such a laboratory. These included research leading to standardisation of routine treatment and handling techniques for plant material, development of more efficient and uniform methods of treating seeds with reactor-produced neutrons, and so on.

RICE RESEARCH

Another meeting, held in Manila from 21 to 25 February, was attended by scientists holding Agency research contracts within the framework of the Co-ordinated Programme of Research on the Use of Induced Mutations in Rice Breeding. It was the second co-ordinating meeting of this group, the first having been held in Bangkok in February 1965. The contractors are from seven countries in South-East Asia: Ceylon, China, India, Japan, Pakistan, the Philippines and Thailand. Also present at the meeting were representatives from the International Rice Research Institute in the Philippines, the International Rice Commission and several invited expert consultants.

Some interesting results were reported. Japanese scientists described mutant lines of rice which were able to reach maturity 40 days sooner than the mother variety while maintaining the same yield. From the Republic of China it was reported that four mutant lines had been produced which outyielded the best local varieties by 3 to 8 per cent while having superior straw strength. These lines are now undergoing advanced agronomic testing. Indian scientists reported the production of several rice mutants having fine grain qualities, high yield and greater resistance to some rice diseases.

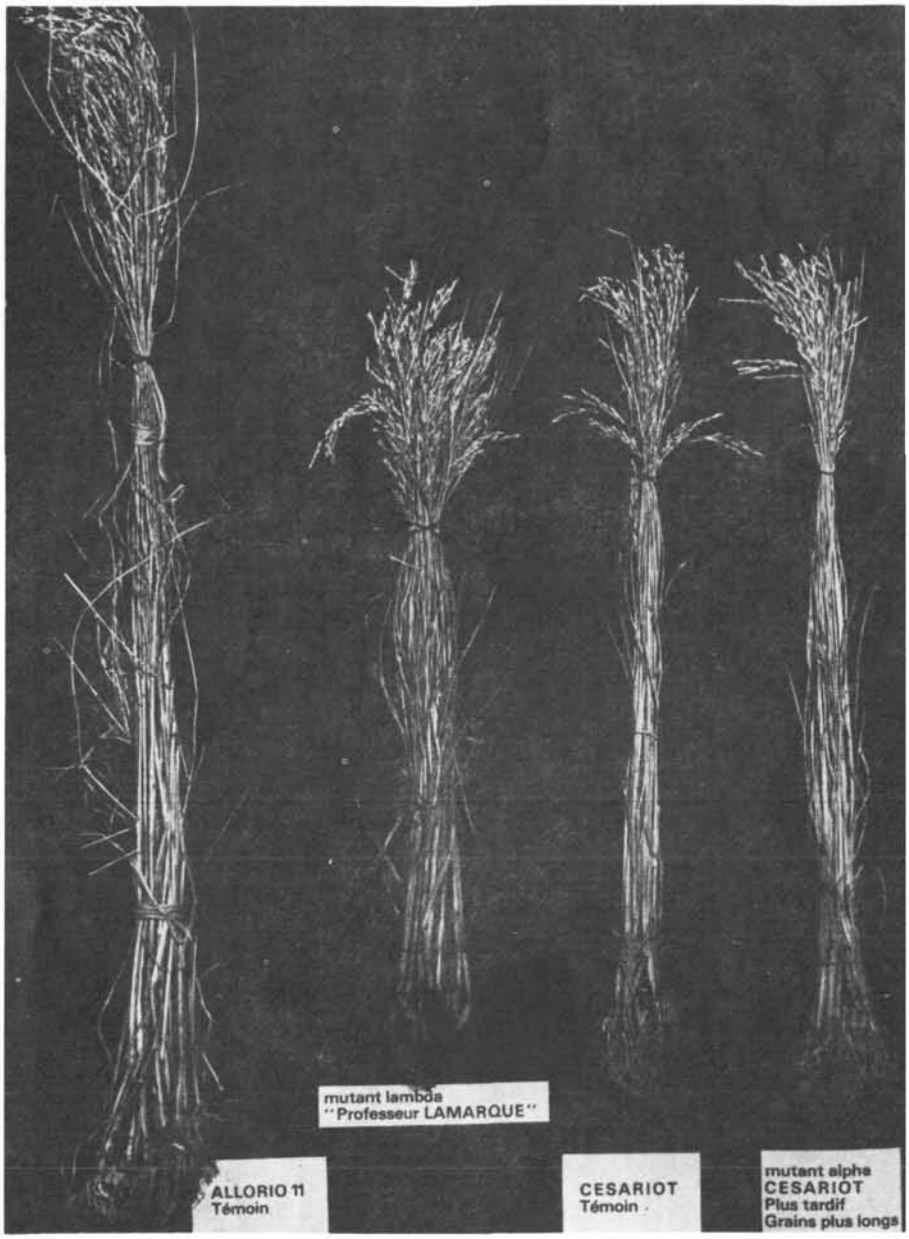
The scientists decided to establish regional trials this year in all seven participating countries, in order to test the performance of the radiation-

Radiation-induced mutations in rice. The mutant (right) has longer grain (see article, page 21, "Bigger and Earlier Crops through Radiation"). (Photo: CEA France).

produced mutants as compared to local and international check varieties of rice. Further steps were also taken to co-ordinate more fully these research activities and to establish closer co-operation between the participating scientists. The International Rice Research Institute will act as the base and clearing-house for many of the co-ordinated activities, including the uniform regional trials. The Co-ordinated Rice Mutation Programme operates as part of the general activities of the International Rice Commission. The Proceedings of the co-ordinating meeting are published in the IRC Newsletter and the activities are reported at the Periodic IRC Working Parties meetings; the next is due to be held in USA in July 1966.

The Joint FAO/IAEA Division also held concurrently in Manila a panel meeting on the "Use of Isotopes and Radiation in Studies of Rice Insects". Two joint sessions were convened with the entomologists and the plant breeders; it was obvious that they had much in common and could benefit considerably from closer co-operation, both with regard to breeding rice plants resistant to insect attacks and to developing techniques leading to insect control through the use of the sterile male technique.

Experience has shown that the Agency's research contract programme becomes more effective when conducted within the framework of well-organised co-ordinated projects, enabling the contractors to meet regularly in order to compare results, consult experts and plan their research together. In some parts of the world these co-ordinating meetings sponsored by the Agency afford the only opportunity for the scientists to meet and to exchange ideas and experiences.



Creation of new mutants of two varieties of rice. From left: the control, and next to it, the mutant having a shorter and stouter stem which is slower in developing and has longer grain. (Photo: CEA France)