STATISTICAL METHODS IN PLANT AND ANIMAL BREEDING

A SYMPOSIUM on the application of Statistical methods to plant and animal breeding was held on the 26th and 27th December 1946, under the joint auspices of the Indian and National Academies of Sciences during their annual session at Allahabad.

Dr. Panse (Indore), who opened the discussion, dealt with the importance of plant breeding as a means of producing better crops without the need of any extra expenditure on the part of the cultivator. Considerable progress had been made in the past with this method of improvement and improved varieties of sugarcane, rice, wheat and cotton were already being grown on a fairly large acreage ; but the plant breeder had still to cover a wide field, and in order that he should do his task efficiently, an increasing application of statistical methods to plant breeding was essential. Dr. Panse then considered the various problems that a plant breeder is confronted with in the initial choice of suitable material for selection, the process of selection in this material, and the maintenance of improved strains evolved as a result of selection. He pointed out that there were two criteria for the choice of material suitable for selection, namely, mean values and genetic variability. He illustrated with the help of data from a cotton-breeding experiment carried out at Indore, how these criteria could be measured and used. The superiority of the progeny-row technique on mass selection was in his view an essentially statistical argument. He then explained how statistical method could be profitably employed by the plant breeder at the different stages of his work thereby increasing his chances of success.

Dr. Sukhatme (Delhi) discussed the use of statistical methods in the field of animal breeding. He pointed out that animal breeding had lagged far behind plant breeding in the use of statistical methods, and illustrated, by means of data of an animal breeding project, how, owing to the lack of proper planning and statistical examination of the results obtained during the course of the project, it was discovered, after a period of ten years during which the scheme was in progress, that no real improvement was achieved. He explained how this conclusion was established clearly by a critical examination of the full results of the scheme with the help of statistical methods. While he felt that experimental techniques based on statistical principles had a more limited scope in animal breeding as compared to plant breeding, he emphasised the need for a careful examination of the progress of an animal breeding programme from the beginning by the use of appropriate statistical methods.

Dr. Ramdas (Poona) pointed out the meteorological aspect in plant breeding and explained how drought-resistance of crop varieties could be tested in glass houses under controlled humidity and temperature.

Mr. Koshal (Poona) discussed the statistical analysis of F_1 data for obtaining information of genetic interest with the illustration of fibre characters in three crosses between Cwn. 520, Bani and Malvi strains of cotton. He pointed out the need of randomised replicated trials right from the beginning of selection. Otherwise the breeder is often misled into selecting material on the basis of non-genetic variation and such selection proved futile when progenies are grown from the selected plants.

Mr. Kishen (Lucknow) explained the use of discriminant function for plant breeding. He also emphasised the need for randomised and replicated trials and suggested the use of modern incomplete block designs in plant breeding. He then considered the possibility of using similar designs in trials with animals.

Mr. Bokil (Indore) considered theoretically the relationship between hybrid vigour and F_2 and F_3 variances and gave their expected values for a variety of genetic hypotheses. Referring to Dr. Panse's suggestion that selection in F_1 is worth considering, he pointed out that the F_1 mean appeared a safe guide for selection generally on account of the fact that in none of the genetic cases he had considered, a larger variance in F_2 resulted from a lower F_1 mean.

Mr. Sahasrabuddhe (Indore) compared the efficiencies of various incomplete block designs against ordinary randomised blocks with special reference to cotton breeding with the help of data from a uniformity trial. He stated that his conclusion was that the simple randomized block layout was quite efficient for as many as 125-150 progeny plots of 5 to 10 feet long per block arranged compactly.

Mr. Thawani (Delhi) explained the principle of discriminant function and its use in plant selection. He referred to possible extensions of the simple linear functions that have been recommended.

Among other speakers that took part in the discussion, Dr. Chandrasekhar (Calcutta) stated that the statistical method was the only possible approach to the study of human genetics.

Mr. Ramiah (Cuttack), who summed up the discussion, agreed with the view that a close co-operation between the breeder and the statistician was necessary. The progress already made in this direction was, in his opinion, satisfactory, and he hoped with confidence that statistical methods will play an increasingly useful role in the work of crop and animal improvement in India.

NEW SCHEMES OF THE COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH, INDIA

A sum of about Rs. 5·5 lakhs has been sanctioned for continuing the work on various research schemes in Universities and Research Institutions. Some of the new schemes that have been sanctioned are, development of high purity manganese, manufacture of Beryllium and its alloys, investigations on rare earth minerals, study of industrial wastes as supplemental sources of nitrogen and vitamins, investigations on micro-waves from extra-territorial sources and on Raman spectra of organic compounds,