



Dr. C.G. Youngs (right) and Dave McPhee of PRL examine selections of peas from the world collection. ● Le Dr. C.G. Youngs (à droite) et Dave McPhee, du LRP, examinent des sélections de pois provenant du monde entier.

would require a protein content high enough to serve as a supplement to cereals in animal feeds; a protein composition which could complement that in cereals to provide a good nutritional balance; a yield which would make it attractive to the producer when priced competitively with other supplements; and it also should be able to be readily processed into forms acceptable for direct human consumption.

"This last requirement could be very important in some of our export areas at the present time," says Dr. Youngs, "and there is a growing interest in the direct use of more plant protein in foods in North America."

Although it may be possible eventually to develop a variety of crops which would meet these requirements, through induced mutations, a cross between two different species, etc., Dr. Youngs says "there are really only two general types of crops to be considered: the leaf or forage crops, and the grain legumes."

Leaf crops offer considerable potential in terms of protein production per acre, but there are problems in storage, shipping, and handling. The fibre content tends to be high and they are difficult to process into a form suitable for direct human consumption.

"These factors," says Dr. Youngs, "prompted us to opt for the grain legumes which have been completely neglected as a potential protein source in Canada."

The lowly field pea — reduced from a 13-million bushel crop in pre-1900 Ontario to a one-million bushel crop in southern Manitoba — was chosen. Field peas possess a number of advantages as a supplementary protein crop. They are adaptable to climatic conditions on the Canadian prairies and can be handled by existing

farm machinery. They can be stored and shipped like other grains and because of their low fat level of about one per cent, rancidity or heating problems should be no more pronounced than in cereals. Peas contain no known toxic materials or enzyme inhibitors and should require no processing other than grinding for use in feeds. The characteristic flavor is not unpalatable to animals and on cooking becomes quite acceptable in certain foods, for example, pea soup.

"These are all plus factors," says Dr. Youngs, "but they do not answer the basic question whether field peas contain sufficient protein of a suitable composition to be economically produced as a feed supplement or as a protein source in foods."

Since protein content previously had not been considered as a quality factor in peas, no information was available on the protein in Canadian varieties.

"Fortunately," says Dr. Youngs, "Dr. Ali-Khan at the Canada Department of Agriculture's Morden Research Station at Morden, Manitoba, had saved samples of various selections that had been grown at a number of stations over several years, and we were able to analyze them."

Highly significant variation was found between varieties, indicating that increased protein levels could be obtained through breeding and selection. A search for high protein germplasm in the world pea collection ensued. The initial 506 selections checked had a range of 23 to 32 per cent protein. In addition, some 2,000 selections of peas were grown on plots at the University of Saskatchewan last summer and are currently being analyzed for protein content at PRL. This material will be turned over to Dr. A. Slinkard who has just come to the University of Saskatchewan from the University of Idaho and will be spending full time on pea breeding.

Dr. H.M. Austenson of the Crop Science Department at the University of Saskatchewan has initiated studies on the agronomic problem in pea production i.e., seeding rate, seeding date, inoculation, fertilization, disease and pest control, crop rotation and nurse crops such as peas seeded with barley to help hold the pea plants upright and simplify harvesting.

Dr. Milt Bell at the University of Saskatchewan has demonstrated that native Canadian field peas could replace the soybean and fish meal portion of swine feed.

Nutritional tests by PRL staff on bread from wheat flour supplemented with pea protein concentrate and wheat gluten have been run in the University's Animal Science Department. These indicate that bread of acceptable quality can be produced that would meet the Food and Drug Directorate definition of "an excellent source of dietary protein." Other foods being tested include snacks, biscuits, beverages and meat analogs.

Arthur Sumner of the Food Technology Section, Home Economics Department at the University, with the assistance of PRL staff, has developed several types of high protein (over 20 per cent) biscuits using pea protein concentrate as a supplement to wheat flour. The