IMPROVEMENT OF PROTEIN PRODUCTIVITY UNDER MARGINAL CONDITIONS IN FINLAND

Hovinen, S. and R. Karjalainen
Hankkija Plant Breeding Institute, Helsinki, Finland

The latitude and climatic conditions of Finland are nearly marginal for growing peas for fodder and cooking. There is therefore considerable variation in seed yield, protein content, and protein yield in different locations and different years. Analyses of phenotypic variability of protein content on 18 genotypes in several years and two locations showed a range of 19.9%-29.8%. A highly significant variation was observed between cultivars and advanced lines. Within certain cultivars the variation was very wide, reaching 20.5%-29.8% in one cultivar. This shows that peas are very sensitive to extreme climatic conditions.

The correlation between protein content and seed yield was negative in four years, $r=-0.179$ to -0.410, $p < 0.05 = 0.396$, and positive in one year, $r=0.313$. The correlation between protein content and seed weight was negative in all cases, $r=-0.118$ to -0.536, $p < 0.05 = 0.396$. Within this material we observed that protein content was positively correlated with growing time in every year, $r=0.138$ to 0.573, $p < 0.05 = 0.396$. The above figures agree well with results recently published in Sweden (1).

Our results indicated that there would be certain difficulties in trying to improve simultaneously both protein content and seed yield with early maturity.

In trials the protein yield per ha varied from 0-1700 kg, and a great part of the total yield per area is often lost because the crop fails to mature. This emphasizes the fact that crop dependability is of crucial importance in breeding programs in Finland. So, in trying to improve protein productivity, the protein content is of less importance compared to seed yield and yield stability, as recently stressed by Snoad (2) in Britain. This means that in northern growing conditions earliness and good lodging resistance guaranteed better protein yields (Fig. 1).

1. Bingefors, S., G. Quittenbaum, and J. Tapia Rogas. 1979. Proteinhaltsvariationer i arter. Sveriges Utsadesforenings Tidskrift 89: 189-208.
2. Snoad, B. 1980. The origin, performance and breeding of leafless peas. Adas Quarterly Review 37:69-86.

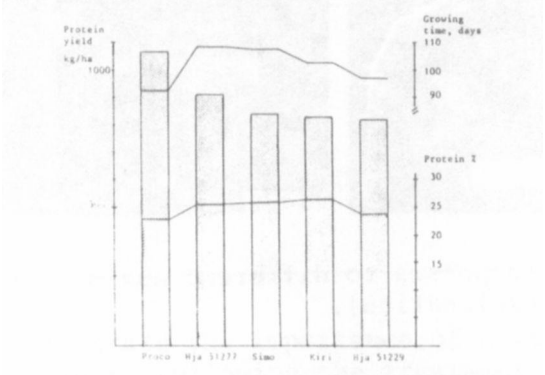

Fig. 1. Protein yield, protein content, and growing time of five cultivars grown in Finland. Proco is very early, Hja 51277 semi-leafless variety with good lodging resistance.