

PRODUCTION, UTILIZATION, AND MARKETING OF FIELD PEAS

Slinkard, A. E. University of Saskatchewan, Saskatoon, Sask., Canada

The final report on this 5-year project has been completed, but extra copies are not available. Accordingly, a condensed version of the Research Highlights pertaining to genetics and breeding is presented here.

1. Near isogenic populations were used to show that wrinkle-seeded lines averaged about 3% higher in percent protein than genetically similar smooth-seeded lines. Wrinkle-seeded lines contain about the same amount of nitrogen per seed as do genetically similar smooth-seeded lines, but since the wrinkled seed is smaller, it has a higher percent protein. In plants segregating for smooth vs wrinkled seeds, the wrinkled seeds were always higher in percent protein than the smooth seeds on the same plant.
2. Wrinkle-seeded lines also have smaller seeds, lower yield, lower percent starch, and lower percent emergence than genetically similar smooth-seeded lines.
3. There is a negative correlation between percent protein and seed yield.
4. Plant-to-plant variation in percent protein is too great to permit effective selection for percent protein on an individual plant basis.
5. Percent protein decreased slightly but consistently from the first to the third fruiting node, indicating a significant within-plant variation in percent protein.
6. Results from reciprocal grafts between high protein, wrinkle-seeded lines and low protein, smooth-seeded lines indicate that the genotype of the shoot and not of the root largely determines percent protein of the seed.
7. Green and yellow cotyledon color have no differential effect on percent protein, percent starch, seed size, or seed yield.
8. There was no relationship between percent protein and seed weight, a result in opposition to results reported in cereals.
9. Protein yield is highly positively correlated with seed yield, but only slightly correlated with percent protein, suggesting that greater progress can be made in breeding for increased protein yield by increasing seed yield than by increasing percent protein.
10. Heritability was high for days to first flower (a measure of maturity) and plant height and low for percent protein, seed yield, and percent methionine expressed as percent of protein.
11. Genetic studies on percent methionine in plants should express percent methionine as percent of protein (mg/g protein) and the use of percent methionine as percent of meal (mg/g meal) should be reserved for nutritional studies.
12. There is a narrow range of genetic variation for percent protein (about 10%), with adapted varieties near the mid-point. Most of the high protein lines were wrinkle-seeded, further reducing genetic variation for percent protein in smooth-seeded peas.