INHERITANCE OF PROTEIN CONTENT IN PEA

I. INHERITANCE OF PROTEIN CONTENT ON THE BASIS OF DIALLELIC CROSSES

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Polish agriculture is faced with a demand for developing high protein pea varieties to serve as dry fodder components. Therefore, studies have been undertaken to find out the mechanism of inheritance of protein content in some selected pea varieties.

This part of the study was designed to determine estimates of general and specific combining ability and of major genetic Parameters for a selected set of pea lines. Two high yielding varieties ('Stral' and 'Flavanda') and two lines from Wiatrowo (WTD 4011 and WTD 4015) were used for crossing and diallel analyses. The latter contain approximately 30% crude protein and are prospective for genetic and breeding experiments. The aforementioned varieties and lines were crossed in a 4x4 daillel arrangement. A field experiment was set up comprising the 4 parents and 12 hybrids in five randomized complete blocks. Statistical analysis was made according to Hayman (1954), Griffing (1956), and Dobek et al. (1977, 1978).

Table 1 presents the mean protein content in seeds of the parents and F2. Statistical analysis indicated significant differences for the general and specific combining ability. The effects of reciprocal crossing were insignificant. The diallel analysis indicated adequacy of the additive-dominance model of gene action for the analyzed set of genotypes. It allowed for an appraisal of Mather's genetic parameters. They are relatively equal:

$D=14.85+0.74$; $F=6.0411.91$; $H1=5.20\pm2.15$; $H2=4.47\pm1.99$; $h^2=7.00\pm1.35$.

The values of these parameters indicate the significance of the effects of additive gene action and dominance effects, but there was dominance in all crosses towards lower protein content.

The degree of dominance equals 0.59. Calculated broad and narrow sense heritability coefficients were 92.7% and 75.1%, respectively.

Table 1. Mean protein content (%) in parents and in F_2

	WTD 4011	WTD 4015	Stral	Flavanda	Mean
WTD 4011	31.1	27.7	26.0	26.1	27.1
WTD 4015	27.7	30.2	24.7	25.7	27.1
Stral	26.5	24.3	25.2	23.5	24.9
Flavanda	25.7	25.3	23.9	23.0	24.5
Mean	27.8	26.9	24.9	24.6	