

FURTHER ELECTROPHORETIC STUDY OF ENZYME POLYMORPHISM IN PISUM

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The earlier reported electrophoretic analysis of leucine aminopeptidase and amylases (in cotyledons of mature seeds), glutamate oxaloacetate transaminase (in leaves), and peroxidases (in roots) in the genus Pisum resulted in detection of a variation which has been tentatively attributed to about 30 alleles at 7 loci (1). In further investigations of enzyme polymorphism in Pisum additional enzyme systems were examined. This report presents preliminary data of electrophoretic screening for variation in alcohol dehydrogenase (ADH), isocitrate dehydrogenase (IDH), and esterases (Est) in cotyledons of mature seeds.

As in previous investigations, 108 lines and populations representing P. elatius (four lines), P. humile (three lines), P. sativum (85 lines), P. abyssinicum (11 lines), and P. fulvum (five lines) were analyzed. Electrophoretic separation of the examined enzyme systems was carried out in starch gels. Activity of esterases was detected under ultraviolet light using 4 methylumbelliferyl acetate as a substrate. Since multiband spectra of esterases were difficult to interpret, only one zone of activity, with bands having R_p values in the range ca 0.43 - 0.48, was considered.

The observed variation in the investigated enzyme systems is shown in Fig. 1. For the present, we have simply identified the distinguished phenotypes by numbers instead of by gene symbols.

As regards distribution of the distinguished phenotypes, it is interesting from the taxonomic point of view that some phenotypes (ADH, Nos. 1 and 2; Est, No. 1) were found only in P. abyssinicum. Of the ADH phenotypes, No. 1 was found in 10 lines while No. 2 was found in one line (JI 691) of P. abyssinicum. The Est phenotype No. 1 was observed in all the examined P. abyssinicum lines.

In the previous paper (1) several Pisum accessions were reported to show rare electrophoretic phenotypes and to contribute significantly to an overall diversity of the investigated material. Two of the accessions, Gat. 255 (P. elatius) and JI 224a (P. fulvum), had rare phenotypes at 4 and 2 independently varying enzyme activity zones, respectively. Rare electrophoretic phenotypes were also shown in the present investigations. Gat. 255 (P. elatius) and JI 224a (P. fulvum) were the only accessions showing Est phenotype No. 2 and ADH phenotype No. 5, respectively.

- A cooperative investigation performed under an agreement between the Royal Swedish Academy of Sciences and the Polish Academy of Sciences. This work was Supported by the Polish Academy of Sciences, partly under the Government Project PR-4.

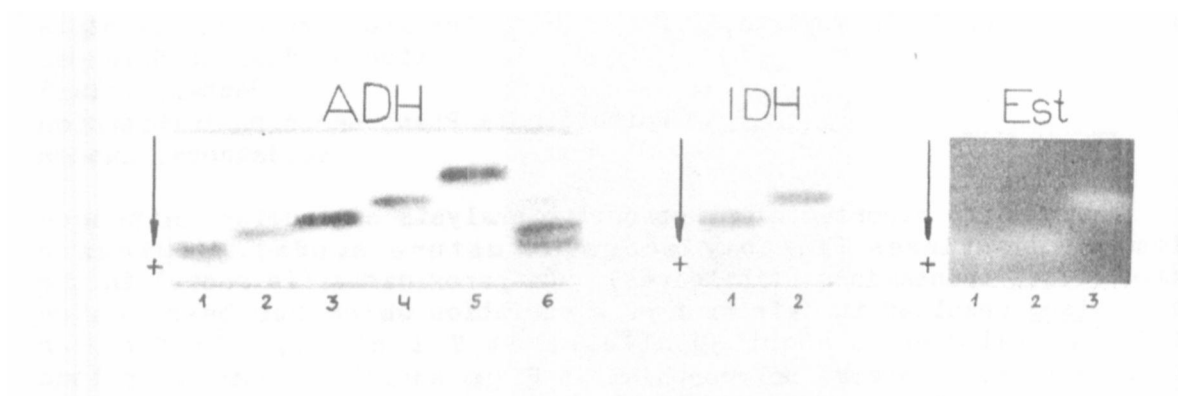


Fig. 1. Electrophoretic phenotypes of ADH, IDH and Est (on variant zone) systems revealed in Pisum. The presented phenotypes are produced by the following lines.

ADH: 1 - P. abyssinicum. W 808; 2 - P. abyssinicum. JI 691;
 3 - P. sativum. W 110; 4 - P. sativum. W 1935;
 5 - P. fulvum. JI 224a; 6 - P. sativum. W 1896;
 IDH: 1 - P. humile. JI 261; 2 - P. sativum. W 110;
 Est: 1 - P. abyssinicum. W 1570; 2 - P. elatius. Gat. 255;
 3 - P. fulvum. W 1256

1. Przybylska, J., S. Blixt, H. Parzysz, Z. Zimniak-Przybylska. 1982. *Genetica Polonica* (in press).