

Assessing the Diversity and Relationships among Resistant Irish Brassica Species

The plant genus *Brassica* L. has economic, agronomic and medicinal importance and includes edible varieties such as cabbages, kales, broccoli and brussels sprouts. Assessing genetic diversity is an essential component in germplasm characterisation and conservation. The main aim of this project was to assess the genetic diversity in Irish *Brassica oleracea* species based on morphological and AFLP markers.

25 accessions of *Brassica oleracea* (comprising kales, cabbages cauliflowers and brussels sprouts) were planted and over the course of their life cycle 44 individual morphological traits were recorded. Vegetative preflowering and maturity traits showed higher variation than seedling traits. Cluster analysis grouped the 25 accessions into 4 main clusters corresponding to kales, cauliflowers, cabbages and sprouts, and also showed that the cauliflowers were more closely related to the cabbages than the kales were. Of the 44 morphological descriptors used, 28 were significantly different and proved useful for examining genetic diversity among accessions studied. However, 31% of the total phenotypic variation was due to differences among accessions.

DNA samples were extracted from each accession and used for AFLP analysis. The AFLP fragments generated by the 4 AFLP primer pairs assayed were different in number, intensity and position, indicating a high genetic variation of the accessions studied. 153 AFLP fragments (89.47%) were polymorphic and could differentiate the accessions analysed, reflecting a rich allelic diversity in the populations. The results also showed that although the accessions had a considerable level of genetic diversity, the distribution of this diversity was not homogeneous. The coefficient of genetic differentiation among accessions (G_{ST}) indicated that approximately 70.5% of the total genetic variation was due to differences among accessions, and 29.5% of the AFLP variation resided within accessions.

In conclusion, morphological traits and AFLP markers showed a significant genetic variation in Irish *Brassica oleracea* accessions, and future attempts at *Brassica* breeding should take these results into consideration to broaden the genetic bases of commercially grown varieties. The results could also help to improve conservation strategies, and could be used as a baseline for the studies attempting to establish relationships for future diversity assessment of *Brassica* germplasm in Ireland.

Project Coordinator: Dr. Renee Malone