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INTRA- AND INTER-VARIETAL VARIETIES IN OIL SEED RAPE MEASURED BY DNA MARKERS

Document prepared by experts from the
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The objective of the study was, before starting a project on essential derivation, to examine the inter- and intra-varietal variability of oil seed rape, the focus being on intra-varietal variability.

15 varieties were chosen according to their varietal structure: 3 di-haploids, 3 ”pure lines”, 3 narrow populations, 3 wide populations and 3 synthetics, from various types - spring and winter - and from various geographic regions.

Name	Category	Type	Region	TG Code
Mikado	DH	Winter	EU	9
Quantum	DH	Spring	CA	12
Pollen	DH	Winter	EU	11
Legend	Narrow pop	Spring	CA	7
Westar	Narrow pop	Spring	CA	14
Lirajet	Narrow pop	Winter	EU	8
Columbus	Pure line	Winter	EU	2
Drakkar	Pure line	Spring	EU	4
Bristol	Pure line	Winter	EU	1
Dexter	Synthetic	Winter	EU	3
Winner	Synthetic	Winter	EU	15
Karola	Synthetic	Winter	EU	6
Excel	Wide pop	Spring	CA	5
Navajo	Wide pop	Winter	EU	10
Rainbow	Wide pop	Spring	AU	13

The chosen molecular platform was SSR, with a set of 80 markers, mapped and well distributed on the genome, freely available or available at a reasonable cost (a license of €80 per marker).

The analysis has been made by TraitGenetics, Germany.

RESULTS

1. Markers

A detailed analysis has been made on the markers distribution, their applicability for fingerprinting and their discrimination power (PIC value). The detailed results are not presented her. A study made by a member of the working group shows that among the 80 markers used, 41 were responding to all the criteria and 39 had some weaknesses.

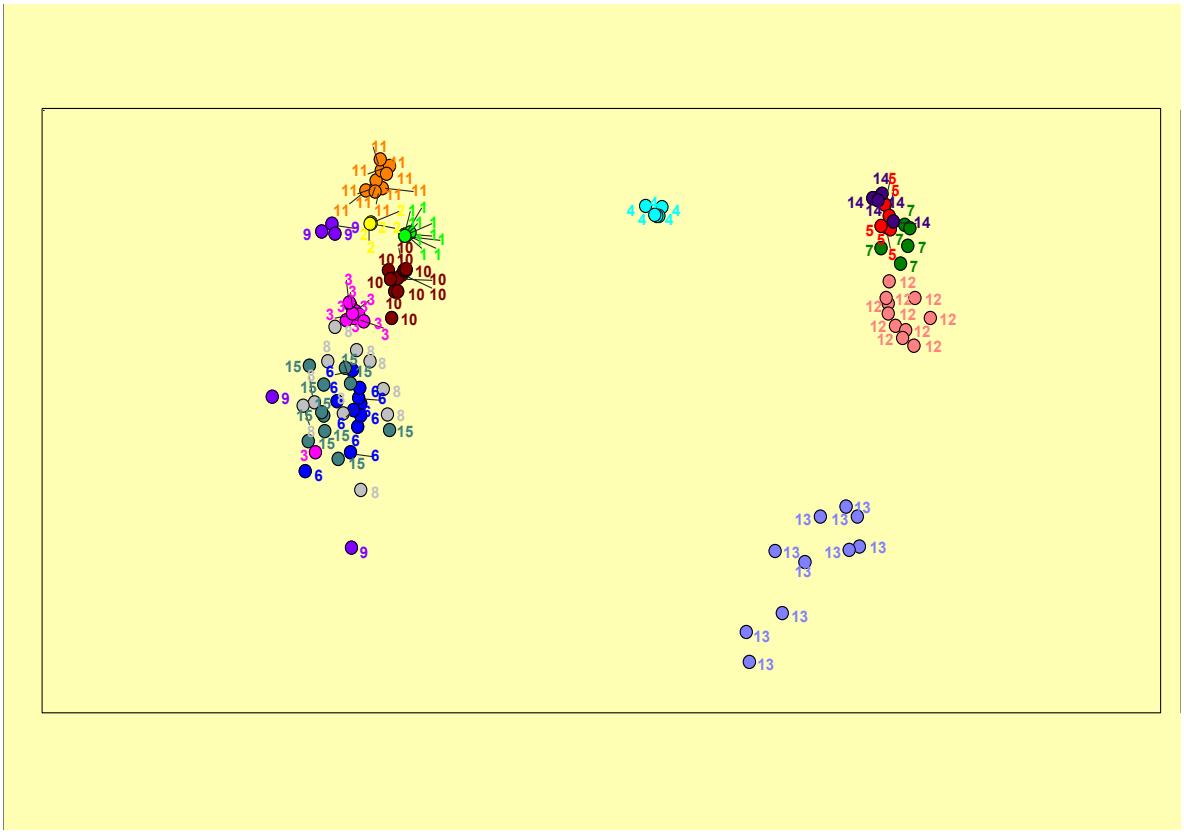
[1] Composition of the Working Group: F. Azanza, I. Bartkowiak-Broda, H. Busch, G. Buzza, D. Charne, JP. Despeghel, M. Frauen, H. Ghijsen, G. Kley, C. Knaak, B. Laga, B. Lambert, C. Lebreton, B. Le Buanec, V. Lombard, M. Matuszczak, S. Pleines, P. Ruaud, D. Rücker, J. Schondelmaier, L. Tulsieram, F. van Eeuwijk

2. Inter- and Intra-varietal variability

2.1 Inter-varietal variability

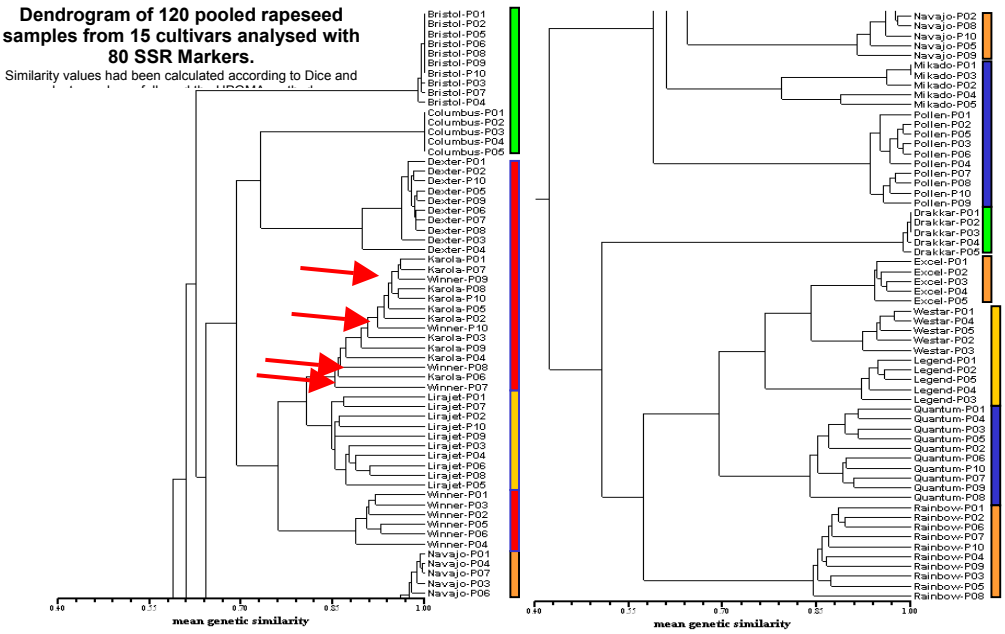
The results show that the winter types are clearly separated from the spring types and that in the spring type the Canadian, European and Australian origin are clearly distinguishable.

Fig. 1: Scaling plot



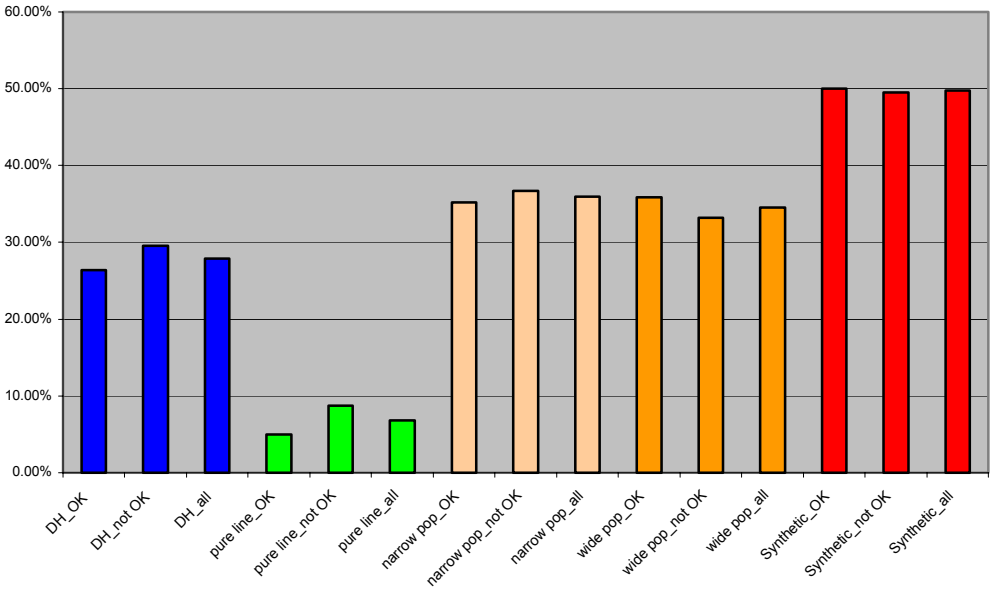
Within each cluster, there is also a significant variability, confirmed by the Dice similarity values, as indicated in the following dendrogram.

Fig. 2: Dendrogram



2.1 Intra-varietal variability

Fig. 3: Mean proportion of markers detecting heterogeneous situations in sampled pools



As expected, the pure lines have lower intra-variability, the synthetic have the largest ones.

Contrary to what was expected, the D.H. have a quite significant variability, at least two of them: Mikado and Quantum. Various hypothesis can be presented: inappropriate maintenance or genetic instability.

Finally, it must be noted that the narrow populations and the wide populations have the same level of variability. It seems that DNA markers do not give the same results as the judgment of the breeders in the field.