MOLECULAR MARKERS TO ASSESS 'SEASONAL TYPE' IN BARLEY

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Example of 'characteristic-specific molecular marker'

see UPOV/INF/18/1 and draft TGP/15/1

Presented at BMT 12 in Ottawa 2010

BMT/12/5 and BMT/12/5 ADD

Seasonal type

Characteristic 29 in TG/19/10 for Barley:

	note
winter type	1
alternative type	2
spring type	3

Assessment in growing trial

Winter (and alternative types) grown in a specific spring-sown trial, not used for any other characteristics

Spring types assessed in normal trial

Genetic control of vernalisation and 'seasonal type'

VRN-H1 determines change from vegetative to flowering stage

VRN-H2 represses *VRN-H1*

'Winter' allele of VRN-H1 prevents flowering unless it is repressed, after cold temperatures, by 'winter' allele of*VRN-H2*

Mutation in either gene gives spring type

Molecular markers

PCR test for alleles of the two genes controlling vernalisation and therefore 'seasonal type'

Characterised all known alleles in 400 GB and 200 wider European Barley varieties

100% reliability in predicting winter or spring type

Prediction of alternative types is more complex, but PCR test reliably identifies varieties which *might* be alternative

Uniformity

PCR test is sufficiently sensitive to detect 5 in 400 off-types

Requirements for use in DUS

Verification of link between marker and characteristic

Test on same number of individual plants with same criteria for distinctness, uniformity and stability as the bioassay

TG/19/10 Barley

IV 1. All observations for assessment of distinctness and stability should be made on 20 plants

IV 3. For assessment of uniformity on single plants, the number of aberrant plants should not exceed 3 in 100

(CPVO DUS protocol requires assessment of at least 500 plants for seasonal type)

Conclusion

PCR test for seasonal type in Barley complies with UPOV guidance for characteristic-specific molecular markers

Have not yet implemented because cost benefit is weak

Thank you