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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

WORKING GROUP ON BIOCHEMICAL AND MOLECULAR TECHNIQUES AND DNA-PROFILING IN PARTICULAR

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MICROSATELLITES FOR VARIETY DISCRIMINATION IN POTATOES

prepared by experts from the United Kingdom

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NIAB

Variety Identification of Potatoes

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Work funded by Food Standards Agency

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NIAB   **Variety Identification of Potatoes**

The Problem:
- **Variety identification is an important quality control and consumer protection issue**
- **Current methods (e.g. morphology, protein electrophoresis) can be inconclusive and not sufficiently robust**
- **DNA profiling methods are becoming the method of choice in other areas.**

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NIAB **Variety Identification of Potatoes**

- **Inter-SSR PCR found to be unreliable**
- **SSRs therefore used**
- **Many available in the literature**
- **Following evaluation, selected 10 (on different linkage groups)**
- **Used to analyse 50 varieties (x 3 tubers)**
- **Set of 5 of these were finally selected (usefully polymorphic and gave good, easily scored, products on the LI-COR)**
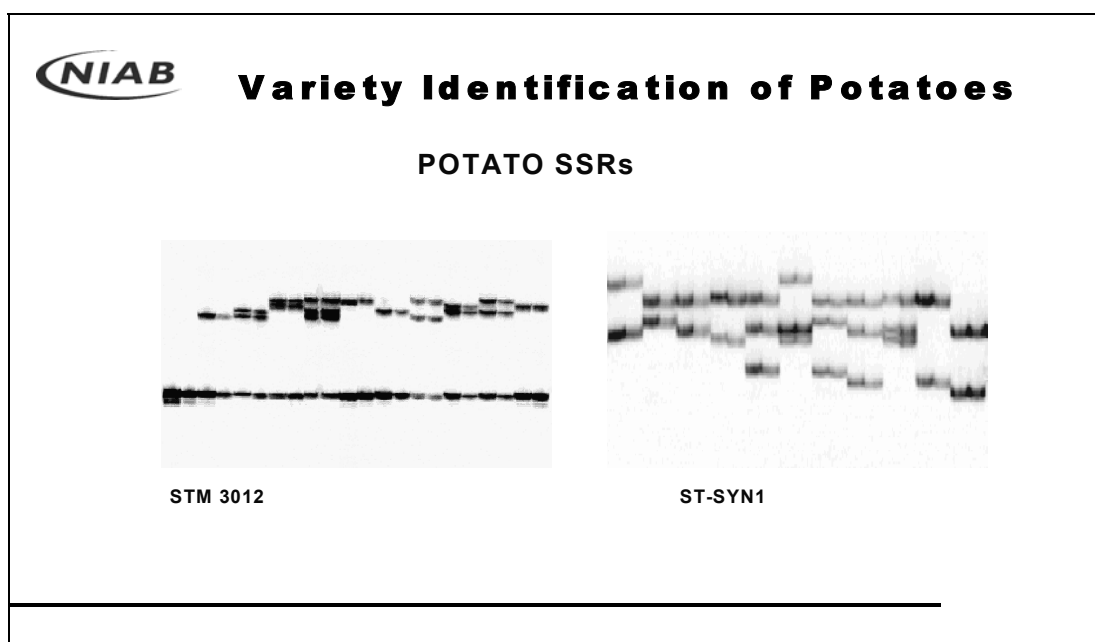
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NIAB **Variety Identification of Potatoes**

Potato SSRs

Linkage Group	Locus	Repeat Motif	Predicted Size (bp)	Used in database
I	STM 2020	$(TAA)_6$	162	Yes
II	STM 3018	$(GA)_9$	168	
III	STM 1053	$(TA)_4(ATC)_5$	172	
IV	STM 3016	$(GA)_{27}$	151	
V	STM 0013	$(AC)_{23}(AT)_6(AG)_9$	195	
VII	STM 1100	$(TA)_{22}$	173	
VIII	st-syn1	$(ACTC)_6$	249	Yes
IX	STM 3012	$(CT)_4...(CT)_8$	193	Yes
XI	STM 2005	$(CTGTTG)_3$	166	Yes
XII	STM 2028	$(TAC)_5...(TA)_3.. (CAT)_3$	188	Yes

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Linkage group	Locus	Total no. of bands*	No. of bands per variety	No. of different profiles*	Separation coefficient*
I	STM 2020	8	1-4	24	0.92
VIII	st-syn1	8	0-3	23	0.91
IX	STM 3012	5	1-4	11	0.84
XI	STM 2005	5	1-4	9	0.77
XII	STM 2028	7	1-5	19	0.86

*from 50 varieties

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NIAB   **Variety Identification of Potatoes**

CONCLUSIONS (1):

- Use of a panel of SSRs provides a reliable method for potato variety identification

- Database production possible

- Further investigation of intra-varietal heterogeneity (uniformity) would be useful

- Analyse additional and new varieties

- Survey of potatoes in commerce

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NIAB   **Variety Identification of Potatoes**

CONCLUSIONS (2):

- This represents a "down-stream" application of SSRs – markers can be used throughout the production chain

- This also provides a model for variety authentication work (cf. protein electrophoresis in cereals)

- Will be increasing use made of markers for this kind of traceability/quality control work

- Variety registration processes should not be left behind

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