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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**

**Fourteenth Session
Seoul, Republic of Korea, November 10 to 13, 2014**

**USE OF MOLECULAR MARKER TECHNIQUES FOR SELECTION
OF 'SIMILAR VARIETY' ABOUT 'CANDIDATE VARIETY'**

Document prepared by an expert from the Republic of Korea

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The Annex to this document contains a copy of a presentation "Use of Molecular Marker Techniques for Selection of 'Similar Variety' about 'Candidate Variety'" made at the fourteenth session of the Working Group on Biochemical and Molecular Techniques and DNA-Profiling in particular (BMT).

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[Annex follows]



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Use of Molecular Marker Techniques for Selection of 'Similar Variety' in DUS Testing



BMT 14th session
November 2014
Kyoung-In Seo

-1-

Table of Content

- What to use for the molecular markers in KSVS?
- Use of molecular markers in the DUS testing for the selection of similar variety
- Cases for similar variety selection by molecular markers

-2-

What to Use for the Molecular Markers in KSVS?



-3-



Overview of Molecular Marker Database for Variety Identification

Consolidated List of Species and Varieties

(2014.11)

Category	Crop	Techniques	Number of varieties	Category	Crop	Techniques	Number of varieties
Vegetables (12)	Pepper	SSR	672	Fruit tree (6)	Peach	SSR	174
	Watermelon	SSR	300		Apple	SSR	67
	Melon	SSR	180		Blueberry	SSR	34
	Tomato	SSR	122		Citrus Fruits	SSR	113
	Onion	SSR	77		Plum	SSR	160
	Strawberry	SSR	110		Pear	SSR	87
	Cabbage	SSR	435	Flower (1)	Rose	SSR	70
	Oriental melon	SSR	108	Grains and Oilseeds (4)	Rice	SSR	373
	Pumpkin	SSR	167		SNP	78	
	Radish	SSR	288		Barley	SSR	71
	Lettuce	SSR	171		Soybean	SSR	148
	Cucumber	SSR	175	Mushroom (1)	Malze	SSR	90
				Oyster mushroom	SSR	69	
Total(24 crops) 4,339 varieties							

-4-



Application of SSR Marker For Selection of 'Similar Variety'

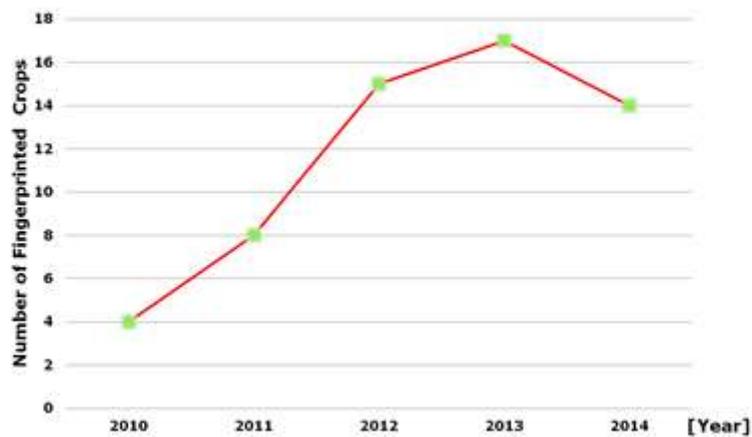
List of Species and Varieties Fingerprinted in 2014

Category	Crop	Varieties/ Fingerprinted	Category	Crop	Varieties/ Fingerprinted
Vegetables	Pepper	24	Vegetables	Oriental Melon	4
	Chinese cabbage	23		Fruit tree	Citrus
	Radish	24	Peach		18
	Cucumber	16	Flower		Rose
	Watermelon	12		Grains and Oilseeds	Soybean
	Melon	12	Rice		38
	lettuce	12			
	Tomato	12			
Total : 14 crops / 268 varieties					

-5-



Applications of SSR Marker in Selection of 'Similar Variety' about 'Candidate Variety'



-8-

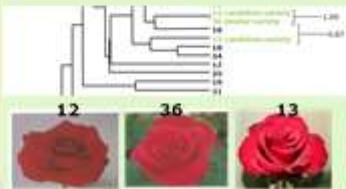
The Selection of 'Similar Varieties' for 'Candidate Varieties'

■ Clues to Selecting

- Parent varieties
- Varieties bred from the same parent variety
- A series of varieties
- Registered varieties
- Broadly distributed varieties
- Well-known varieties



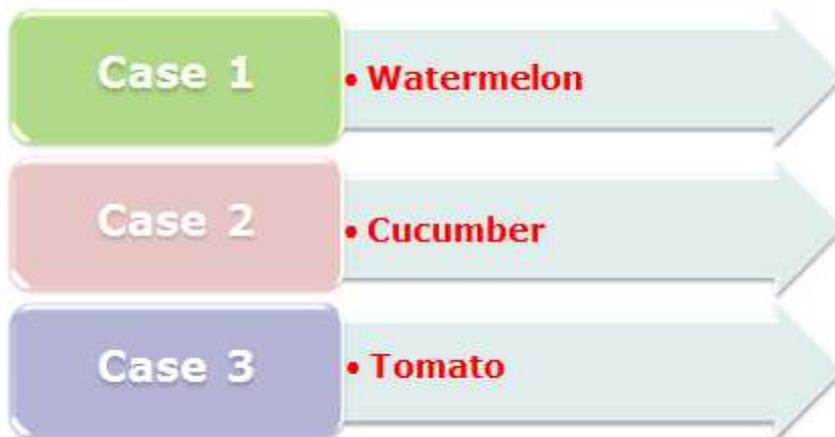
Closely clustered (with high genetic similarity) varieties with candidate variety



-7-



The Cases for Selecting 'Similar Varieties' by Genetic Analysis



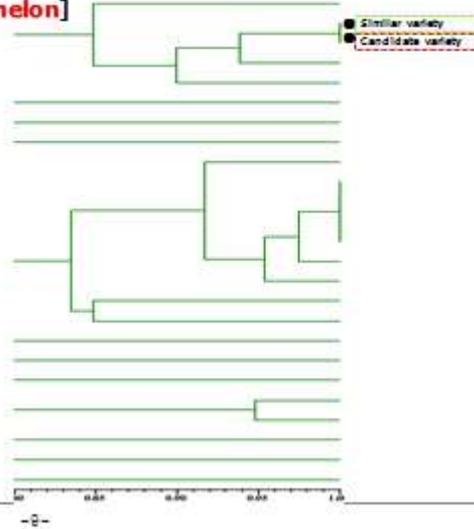
-8-

Use of Molecular Markers for the Selection of 'Similar Varieties'

Case 1. Selection of Similar Varieties by Genetic Analysis

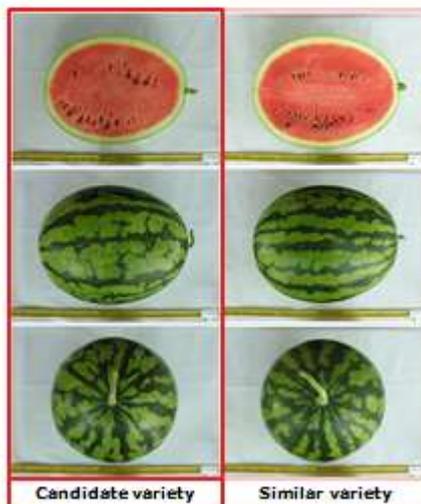
[Genetic Relationship for **Watermelon**]

UPGMA dendrograms showing phylogenetic relationships among the watermelon candidate varieties and similar varieties analyzed by 38 SSR markers



The "DUS Test" (Field Trials)

- The variety with high genetic similarity through DNA pre-screening did not distinguished for morphological characteristics



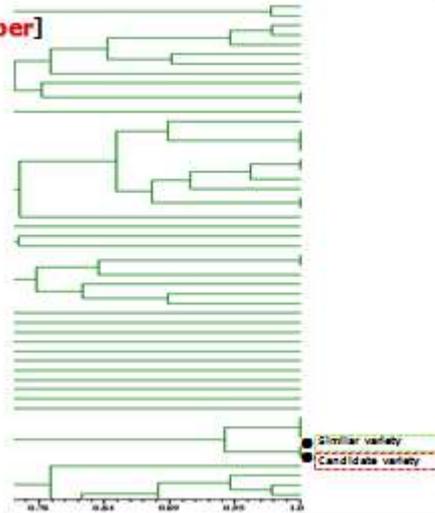
Distinctness
Uniformity
Stability } **DUS**

Use of Molecular Markers for the Selection of 'Similar Varieties'

Case 2. Selection of Similar Varieties by Genetic Analysis

[Genetic Relationship for **Cucumber**]

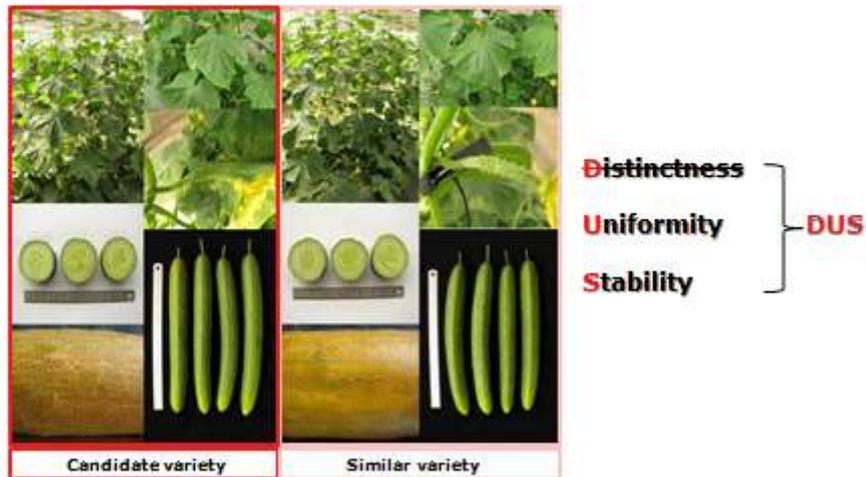
UPGMA dendrograms showing phylogenetic relationships among the cucumber candidate varieties and similar varieties analyzed by 32 SSR markers



-11-

The "DUS Test" (Field Trials)

- The variety with high genetic similarity through DNA pre-screening did not distinguished for morphological characteristics in the DUS test.

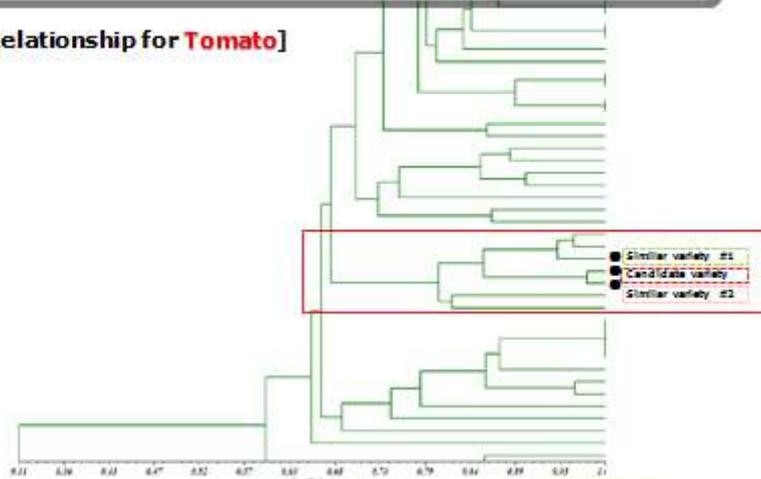


-12-

Use of Molecular Markers for the Selection of 'Similar Varieties'

Case 3. Change Case of 'Similar Variety' about 'Candidate Variety' according to the Results of Genetic Analysis

[Genetic Relationship for Tomato]

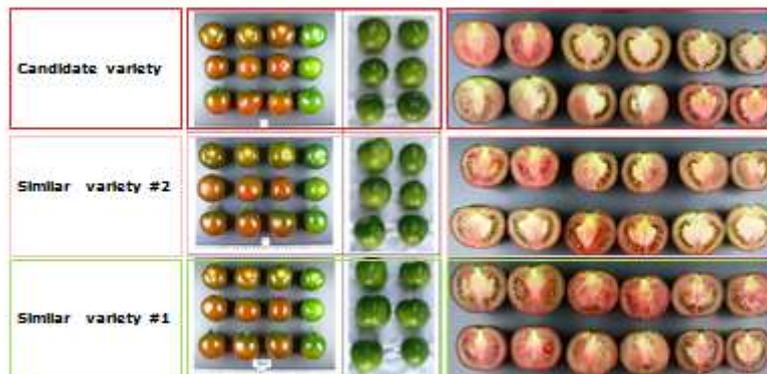


UPGMA dendrograms showing phylogenetic relationships among the tomato candidate varieties and similar varieties analyzed by 30 SSR markers

-13-

The "DUS Test" for Tomato (Field Trials)

■ 2nd Year Results of DUS Testing



Distinctness
Uniformity
Stability } **DUS**

-14-

Outlook

■ We need to:

- Application for selection of similar varieties about DB crops.
- Development and use of gene-specific markers directly linked phenotypic characteristics.
- Expansion of DNA fingerprint database for newly developed commercial varieties.

-15-

Thank you for your
attention!!



Please visit KSVS website at:
<http://www.seed.go.kr/>

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