

IWGP

Jan Dijkstra spinach breeder Nunhems
Netherlands BV

IWGP?

We are **not** the International Wrestling Grand Prix



What is our IWGP?

- **International Working Group on *Peronospera farinosa***
- Located in the Netherlands
- Administration done by PLANTUM NL
 - Spinach seed companies,
 - Naktuinbouw
 - University of Arkansas
 - University of California Cooperative Extension (Monterey County)
 - We are open for input of others.



Members of IWGP



- Naktuinbouw Diederik Smilde
- Univ. of Arkansas Jim Correll
- Pop Vriend **Jan de Visser (chair man)**
- Rijk Zwaan Jan Jansen, Beatrice Lindhout
- Seminis Ben Baerends, John Meeuwsen
- Sakata Yuji Hosobuchi
- Enza Trinette van Selling
- Syngenta Michel de Lange, Tijs Gilles
- Bejo Roel Veenstra, Elly Stam
- Takii Sigfrid Lachmann
- Nunhems Jan Dijkstra
- Advanseed Ehrling Hegelund
- Vilmoren



Targets of IWGP



- Monitoring existing races.
- Reporting the development of new isolates

- Avoid nomination of unimportant new isolates.
- Ring test of new important isolates.
- Denomination of new races.

- Communicate about nomination of new races to all interested parties (including growers).

- Making a type isolate available for researchers and the industry.
- Maintaining type isolates of all races.

- Adjusting the differential set to new races if needed.

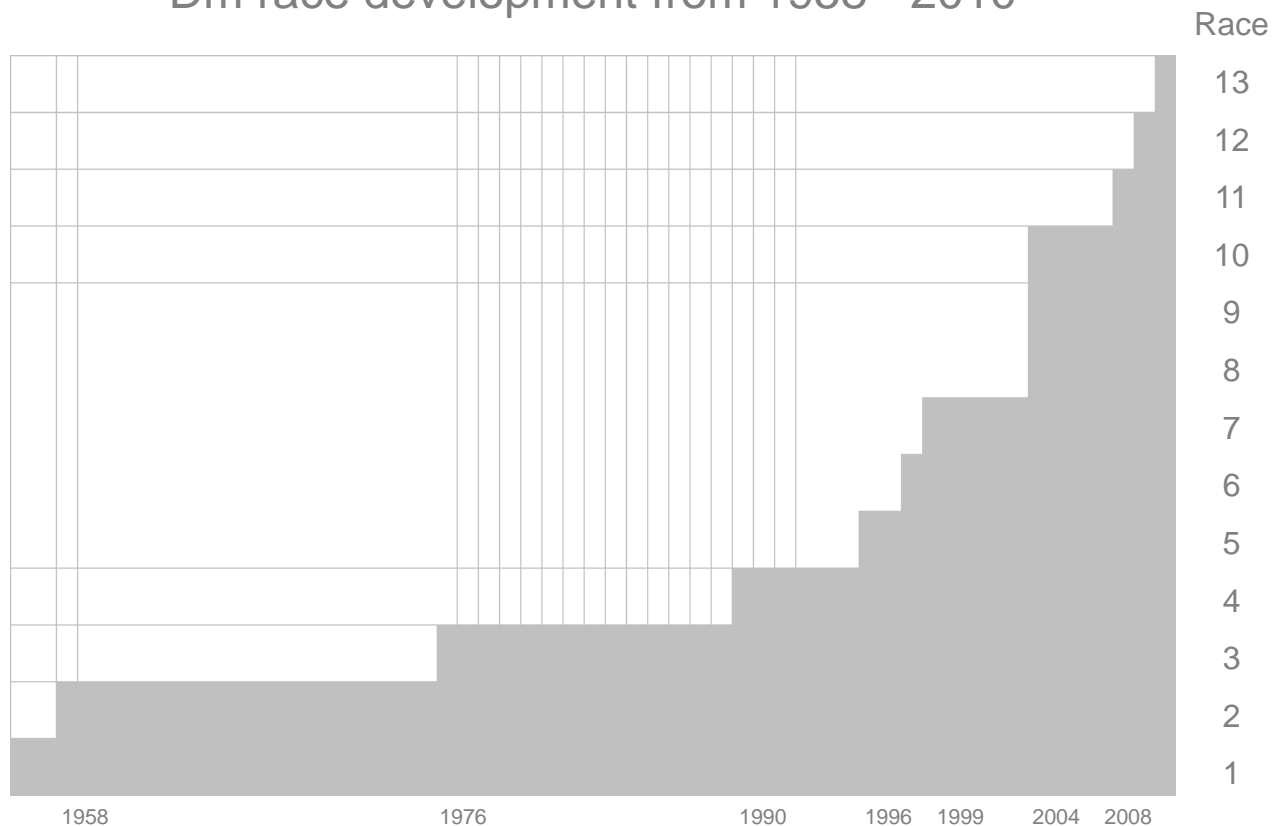


Race development



Year	Race
1824	Pfs: 1
1958	Pfs: 2
1976	Pfs: 3
1990	Pfs: 4
1996	Pfs: 5
1998	Pfs: 6
1999	Pfs: 7
2004	Pfs: 8
2004	Pfs: 9
2004	Pfs: 10
2008	Pfs: 11
2009	Pfs: 12
2010	Pfs: 13

Dm race development from 1958 - 2010



Nr. of firms that reported a race or isolate in a country in 2011.

	US	MEX	NL	GER	BE	FR	SP	IT	TU	CHIN
Pfs: 3									1	
Pfs: 4	1									
Pfs: 5										
Pfs: 6										
Pfs: 7							1			
Pfs: 8			1		1			1		1
new isol a			3		1			1		
Pfs: 9										
Pfs: 10			2				1			
new isol b							1			
Pfs: 11		1	2	1	2	3	1	2		
Pfs: 12	4		4		2	2				
Pfs: 13	4						2	1		
new isol c	1					(1)				
UA4410	2									

In yellow are isolates that could be potential new races

Example of differential set



Disease reactions of races on differential set

	Pfs: 1	Pfs: 2	Pfs: 3	Pfs: 4	Pfs: 5	Pfs: 6	Pfs: 7	Pfs: 8	Pfs: 9	Pfs: 10	Pfs: 11	Pfs: 12	Pfs: 13
Viroflay	+	+	+	+	+	+	+	+	+	+	+	+	+
Resistoflay	-	-	+	+	+	+	+	+	+	+	+	+	+
Califlay	-	+	-	+	-	+	+	-	-	+	-	-	+
Clermont	-	-	-	-	+	+	+	+	+	+	+	+	+
Campania	-	-	-	-	-	+	-	+	+	+	-	+	+
Boeing = Avenger	-	-	-	-	-	-	-	+	-	+	-	+	-
Lion	-	-	-	-	-	-	-	-	-	+	-	-	-
Lazio	-	-	-	-	-	-	-	-	-	-	+	+	+
Whale	-	-	-	(-)	-	(-)	(-)	-	-	+	-	+	+

+ susceptible, - resistant, (-) intermediate respons

From isolate to race



- Firms report disease reaction of deviating isolates to Diederik Smilde at Naktuinbouw.
- When Diederik or Jim gets the same isolate three times or more it will be reported to the group.
- The group decides if this is an important new isolate.
 - has to appear in multiple years
 - has to appear in more countries or areas
 - has to infect a number of important hybrids extra



From isolate to race



- The isolate is tested on a differential set in different labs (ring test).

Jim Correll often tests new isolates on a wide range of hybrids.

- The disease pattern is identified.
- The isolate can be given a number.
- The type isolate will be made available.
- The naming of a new race is published.



Example of UA510C that became Pfs: 13



- Pfs: 13 has been reported two seasons in Yuma (2010 and 2011).
- Pfs: 13 appeared in Salinas in 2011.
- Pfs: 13 attacks quite a number of Pfs: 1-12 resistant hybrids.
- Jim Correll reported about resistance to UA0510C of several hybrids.
- Pfs: 13 is a bit similar to Pfs: 11 with some important exceptions.
- The breeding firms all did a ring test on Pfs: 13 .

All but one reported the same resistance pattern as Pfs: 11.

- It was decided to change the type isolate.
- The naming of Pfs: 13 was published by Smilde and Correll.



Pfs: 13 reaction on the differential set:

1. VIROFLAY	susceptible
2. RESISTOFLAY	susceptible
3. CALIFLAY	susceptible
4. CLERMONT	susceptible
5. CAMPANIA	susceptible
6. BOEING	resistant
7. LION	resistant
8. LAZIO	susceptible
9. WHALE	susceptible

We try to avoid naming less important isolates



For example Pfs: 9 would not have named according to the current rules

- It is a mild variant of Pfs: 8 only affecting very few hybrids extra
- Pfs: 9 disappeared in about a year

Officially all firms and Naktuinbouw have to test for a race that has never been important. We would like to avoid that in the future.



Publications on the internet:

<http://www.naktuinbouw.nl/nieuws/nieuwe-fysio-van-valse-meeldauw-spinazie-benoemd-0>

nak *tuinbouw*



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Home » Nieuwe fysio van valse meeldauw in spinazie benoemd

Nieuwe fysio van valse meeldauw in spinazie benoemd

3 augustus 2011

De internationale werkgroep *Peronospora farinosa* (IWGP) heeft een nieuwe fysio van valse meeldauw in spinazie gekarakteriseerd op een set van differentiële rassen en benoemd als fysio Pfs: 13. Dit fysio is een bedreiging voor de spinazieteelt vanwege de bijzonder goede aanpassing aan sommige Pfs: 1-12 resistente rassen. Als gevolg van de opkomst van fysio Pfs: 13 zullen Pfs: 1-13 resistente spinazierassen sterk in de belangstelling komen te staan van zowel telers als veredelaars.

De IWGP houdt voortdurend bij of er nieuwe fysio's zijn ontstaan door verdachte isolaten te toetsen op een gemeenschappelijk set van differentiële spinazierassen, die het relevante spectrum van resistenties vertegenwoordigen. De IWGP benoemt nieuwe fysio's zodra het nodig is. Hierdoor wordt een consistente en heldere communicatie bevorderd tussen zaadbedrijven en telers over resistentie-brekende fysio's die sterk genoeg blijken om in opeenvolgende jaren in een groot gebied voor te komen, en aanzienlijke economische schade te berokkenen.

Publications on the internet:

<http://cemonterey.ucdavis.edu/?blogpost=5441&blogasset=32041>



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Naming of Another New Race (Race Pfs 13) of the Spinach Downy Mildew Pathogen

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Another new race, the 13th, of the downy mildew pathogen (*Peronospora farinosa* f. sp. *spinaciae*) of spinach has been found and documented. First identified in January 2010 from spinach in Holtville, California, this race breaks the resistance of several important cultivars. The isolate was initially designated as UA0510C and was characterized with a standard set of differential varieties. Isolates apparently identical to UA0510C have been found in an increasing number of locations throughout California in 2010 and 2011. After careful evaluation of the significance of this development to the spinach industry, the International Working Group on *Peronospora* (IWGP) has designated this isolate as race Pfs 13. The IWGP is located in The Netherlands and is administered by Plantum NL.

Race Pfs 13 poses a threat to the spinach industry because it is particularly well-adapted to modern hybrids with resistance to races 1-12. The appearance of a new race is not unexpected because hybrids with resistance to races 1-12 have been widely planted over the past few years. Similar developments have taken place when races Pfs 5 (1996), Pfs 6 (1998), Pfs 7 (1999), Pfs 8 and 10 (2004), Pfs 11 (2009), and Pfs 12 (2009) were identified and named. The occurrence of Pfs 13 will clearly encourage the industry to develop and use new spinach cultivars having resistance to races 1-13. A history of the detection of the various spinach downy mildew races is presented in Table 1.

A collaboration of researchers with the IWGP, University of Arkansas (Correll), and University of California (Koike) is monitoring the development of new races of spinach downy mildew on a global scale by collecting and testing suspected new isolates. In this way it is hoped that research findings and conclusions will be agreed upon and better communicated between the seed industry, spinach growers, and other interested parties. For California and Arizona, the Correll-Koike team will continue to receive and test spinach downy mildew samples for growers, pest control advisors, and seed companies. Industry is encouraged to continue to submit downy mildew outbreak samples to Correll-Koike, as such samples facilitate the discovery of additional new races. The Correll-Koike research is made possible by support from the California Leafy Greens Research Board and by active participation by the agricultural industries in California and Arizona.

For more information on this subject you can contact Steven Koike (stkoike@ucdavis.edu), Jim Correll (jcorrell@uark.edu), Diederik Smilde (d.smilde@naktuinbouw.nl), or IWGP chairperson Jan de Visser (JandeVisser@popvriendseeds.nl).



Publications on the internet and contacts:



www.worldseed.org/.../Spinach_downy_mildew_Differentials_29102010.pdf

spinach.uark.edu/PDF%20files/Germplasm%20screening%2003-2011.pdf

http://www.worldseed.org/isf/strain_identification.html#1

<http://spinach.uark.edu/news.html>

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Thank you very much for your
attention.