PHYLIB

Phytoplasma Survey Results of ZMMAE

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T.C.
GIDA TARIM VE HAYVANCILIK
BAKANLIĞI

Potato growing areas:

~ 173.000 ha (TÜİK, 2013)

Seed potato production

Adana, Afyon, Bolu, Eskişehir, Kayseri, Konya, Sivas, Tokat, Yozgat provinces

Table potatoes are growing almost all provinces

Ek-1

PATATES SERTİFİKASYON STANDARTLARI

	Ön Temel DK SE	Ön Temel OE	Ön Temel E	Temel T1	Temel T2	Sertifikalı S1	Sertifikalı S2
A.Toprak Toleransları							
1. *Ditylenchus destructor*	0	0	0	0	0	0	0
2. *Ditylenchus dipsaci*	0	0	0	0	0	0	0
3. *Meloidogyne spp.*	0	0	0	0	0	0	0
4. *Globodera rostochiensis, G. pallida*	0	0	0	0	0	0	0
5. *Synchytrium endobioticum*	0	0	0	0	0	0	0
B.Bitki toleransları							
1. *Synchytrium endobioticum*	0	0	0	0	0	0	0
2. *Clavibacter michiganensis*	0	0	0	0	0	0	0
3. *Ralstonia solanacearum*	0	0	0	0	0	0	0
4. *Potato spindle tuber viroid*	0	0	0	0	0	0	0
5. *Potato stolbur*	0	0	0	0	0	0	0
6. *Phoma exigua var. foveata*	0	0	0	0	0	0	0
7. *Erwinia spp.*	0	0	0	0,5	0,5	1	2
8. Virüsler (*)	0	0	0	0,25	0,33	1	3
9. Diğer Çeşitler - Tip Dışı	0	0	0	0,25	0,25	0,5	0,5
C.Parti toleransları							
1. *Globodera rostochiensis, G. pallida*	0	0	0	0	0	0	0
2. *Meloidogyne spp.*	0	0	0	0	0	0	0
3. *Synchytrium endobioticum,*	0	0	0	0	0	0	0
4. *Clavibacter michiganensis*	0	0	0	0	0	0	0
5. *Ralstonia solanacearum*	0	0	0	0	0	0	0
6. *Phthorimaea operculella* (**)	0	0	0	0	0	0	0
7. *Rhizoctania solani* (***)	0	0	0	2	2	4	4
8. Toprak ve Yabancı Maddeler	0,5	1	1	1,5	1,5	2	2
9. Kuru ve ıslak çürüklük (****)	0	0	0	1	1	2	2
10. Harici şekil bozuklukları	0,5	0,5	0,5	1	1	2	3
11. Patates uyuzu (*****)	0	1	1	3	3	5	5
12. Toplam Tolerans	1	2	2	5	5	6	6

(*) Belirtilen toleranslar yalnızca Avrupa izolatı olan virüsler için geçerlidir.

(**) Bu etmen partilerde kontrolör tarafından kontrol edilecek olup, Bitki Sağlığı Kontrol Kuruluşu tarafından analize tabi tutulmayacaktır.

(***) Yüzeyinin % 10'undan fazlası bu etmenle kaplanmış olan yumrular sayılacaktır.

(****) *Synchytrium endobioticum*, *Clavibacter michiganensis* veya *Ralstonia solanacearum* tarafından oluştuğu durumlar hariç.

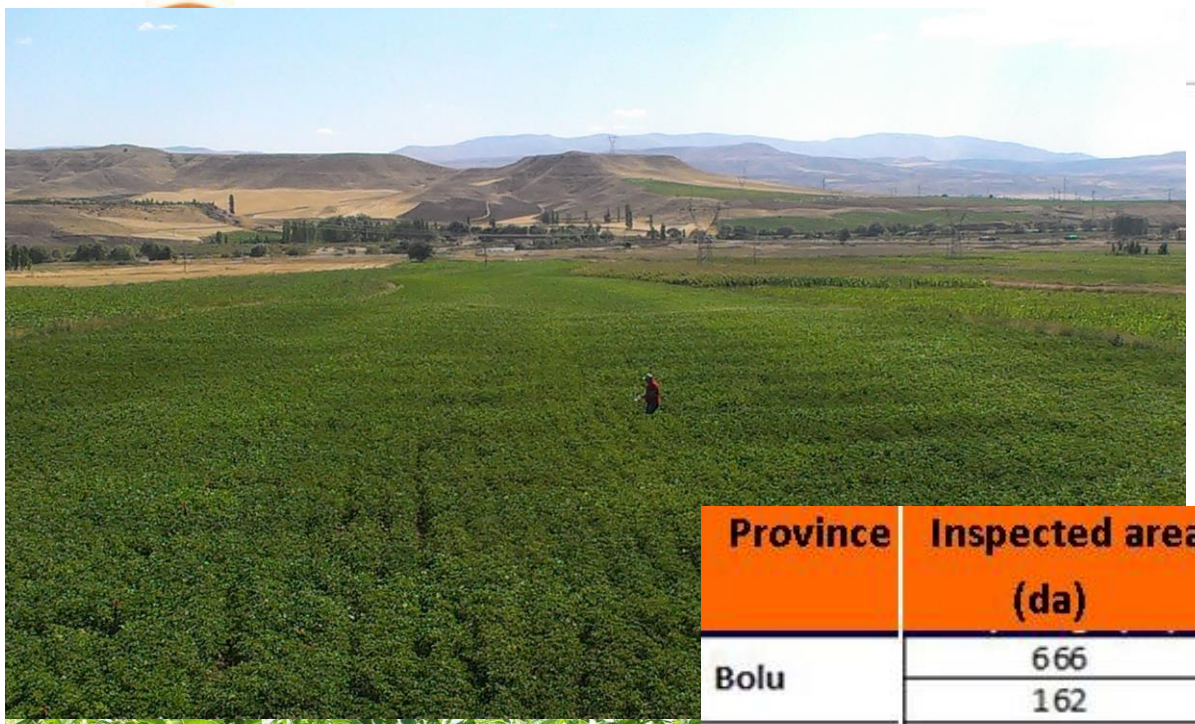
(*****) Yüzeyinin üçte birinden fazlası uyuzdan etkilenmiş olan yumrular sayılacaktır.

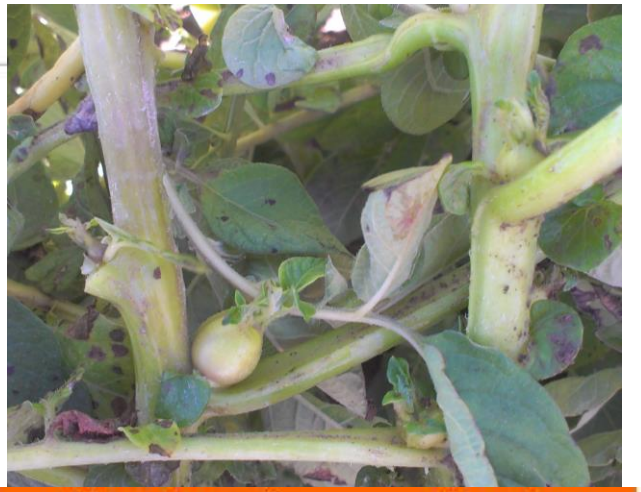
Survey area

Potato fields in 4 provinces

July and August in 2013

Potato surveys





Province	Inspected area (da)	Number of inspected plants	Number of samples
Bolu	666	6600	25
	162	1000	1
	828	**7600**	**26**
Kırşehir	135	1 000	4
	204	600	2
	339	**1600**	6
Yozgat	73	800	5
	70	300	1
	143	**1100**	**6**
Sivas	1980	3200	1
	100	300	0
	460	2 000	5
	222	1500	5
	1164	1700	1
	65	1100	0
	3 991	**9 800**	**12**

Symptoms

Leaf curling, reddish or purple discoloration of leaves, aerial tuber, shortening of nodes

50 suspected samples taken from 4 provinces.

Samples were transferred to the laboratory.

Other hosts were also tested

Tomato, pepper eggplant

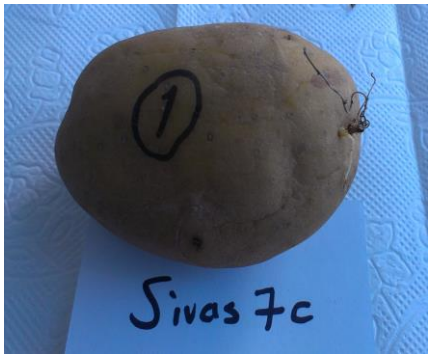
Sample preparation

10-20 leaf midrib taken from each sample

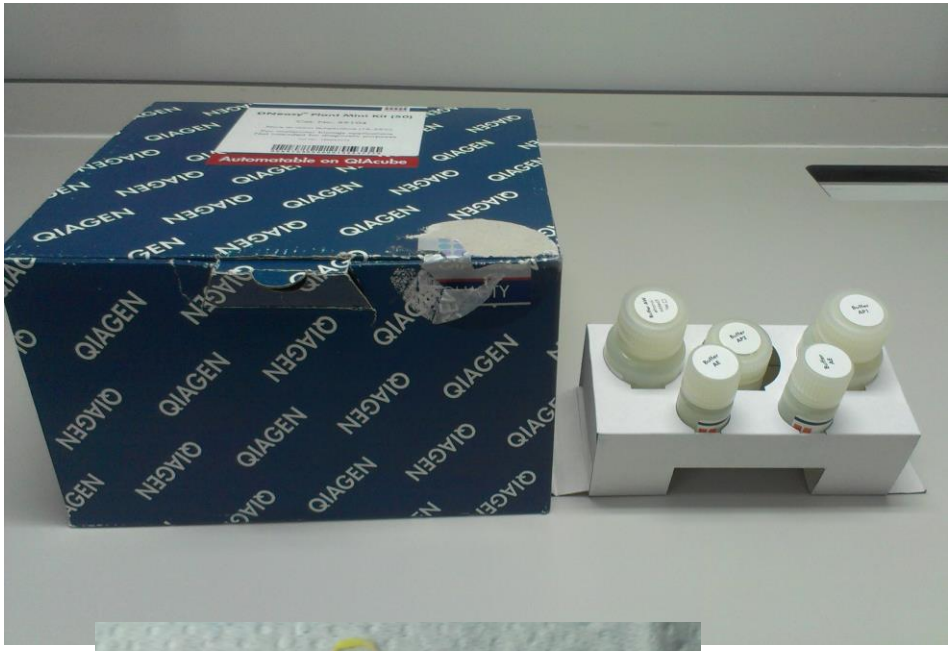
Cutting small pieces (2-3 mm)

0.5 g subsample

Stored -85 ^{0}C in cryogenic tubes until use



Qiagen DNeasy Plant Mini Kit + CTAB buffer

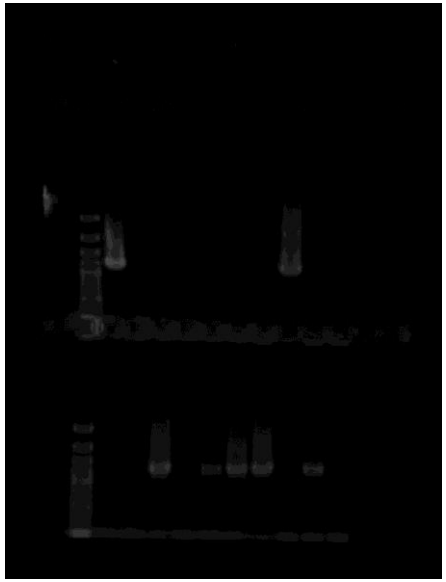


Molecular tests

Nested PCR

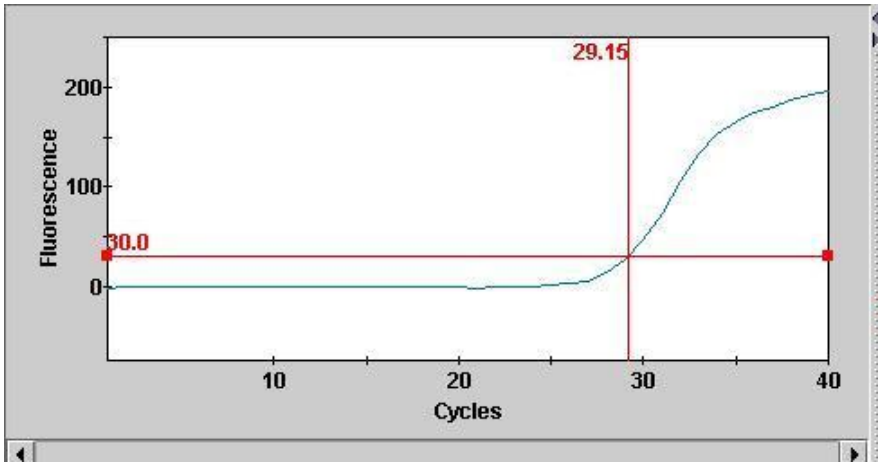
P1/ P7; nested with R16F2n /R16R2

Expected amplicon size 1200 bp

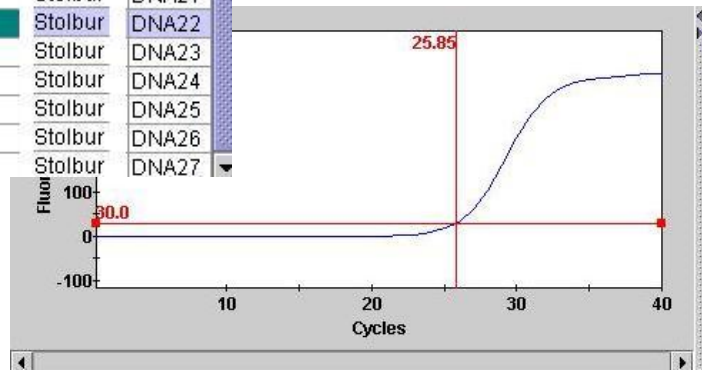


Real-time PCR

Christensen *et al.*, 2004



Site ID	Protocol	Sampl...
A1	Stolbur	Esk. d...
A2	Stolbur	Esk. d...
A3	Stolbur	DNA15
A4	Stolbur	DNA16
A5	Stolbur	DNA17
A6	Stolbur	DNA18
A7	Stolbur	DNA19
A8	Stolbur	DNA20
A9	Stolbur	DNA21
A10	Stolbur	DNA22
A11	Stolbur	DNA23
A12	Stolbur	DNA24
A13	Stolbur	DNA25
A14	Stolbur	DNA26
A15	Stolbur	DNA27



Site ID	Protocol	Sampl...
A1	IStolbur	Esk. d...
A2	IStolbur	DNA 1
A3	IStolbur	DNA 2
A4	IStolbur	DNA 3
A5	IStolbur	DNA 4
A6	IStolbur	DNA 5
A7	IStolbur	DNA 6
A8	IStolbur	DNA 7
A9	IStolbur	DNA 8
A10	IStolbur	DNA 9
A11	IStolbur	DNA 10
A12	IStolbur	DNA 11
A13	IStolbur	DNA 12
A14	IStolbur	DNA 13
A15	IStolbur	DNA 14

Results

18 sample were infected with nested PCR, 12 real-time PCR

Number of samples	Nested PCR		Real-time PCR	
	Stem	Tuber	Stem	Tuber
DNA-1K	+	+ 2/5	-	-
DNA-4K	+	+ 3/5	-	-
DNA-7K	+	+ 1/5	+	-
DNA-33B	+	+ 1/5	+	+ 1/5
DNA-13B	+	+ 2/5	+	-
DNA-1Y	+	-	-	-
DNA-3Y	+	+ 1/5	+	+ 1/5
DNA-6Y	+	+ 2/5	+	+ 1/5
DNA-3S	+	+ 2/5	-	+ 1/5
DNA-15S	+	+ 4/5	+	+ 2/5
DNA-18S	+	+ 3/5	+	+ 1/5
DNA-19S	+	+ 1/5	+	-
DNA-22S	+	-	+	-
DNA-26S	+	+ 1/5	+	+ 1/5
DNA-27S	+	+ 2/5	-	-
DNA-30S	+	+ 1/5	+	-
DNA-38S	+	+ 4/5	+	+ 1/5
DNA-45S	+	+ 1/5	-	-

On-going works

Infected tubers have been planted and covered in insect proof cages. After harvesting tubers will be tested.

Insects have been collected and classified by entomologist.

Comments

Within the this study;

Stolbur phytoplasma on different hosts were detected first time using of molecular methods in Turkey:

Eggplant, pepper

We work also real-time PCR method in our lab using potato and tomato samples for Stolbur phytoplasma.

Maintenance of Stolbur phytoplasma DNAs at -85 ^{0}C in PPCRI.

Thank you for your attention

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