Mycokey

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European Commission

HORIZON 2020

UNIVERSITÀ CATTOLICA del Sacro Cuore

Isolation, Molecular Identification and Mycotoxin Profile of *Fusarium* Species Isolated from Maize Kernels in Iran

ISSUE

Fusarium species are among the most important fungal pathogens of maize, where they cause severe reduction of yield and accumulation of a wide range of harmful mycotoxins in the kernels. In Iran, most of the reports have shown that the species belonging to the *Fusarium fujikuroi* species complex (FFSC) were the most common in maize. Recently, besides fumonisins, the occurrence of deoxynivalenol (DON), T-2 toxin and zearalenone (ZEA) was reported in Iran.

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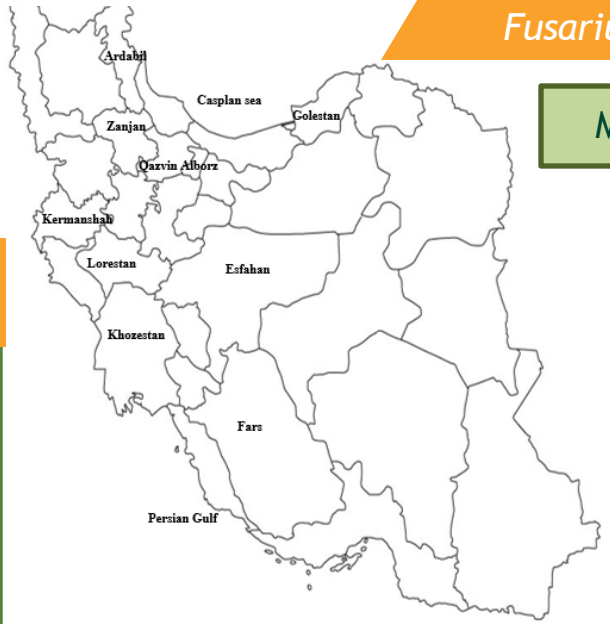
Isolation, molecular identification, mycotoxins

Fusarium species from Iranian maize

APPROACH

- Significative and wide sampling of maize kernels in all the main maize producing regions in Iran
- Molecular identification of *Fusarium* species by sequencing translation elongation factor 1α gene
- Analysis of mycotoxin profile of representative strains belonging to each *Fusarium* species

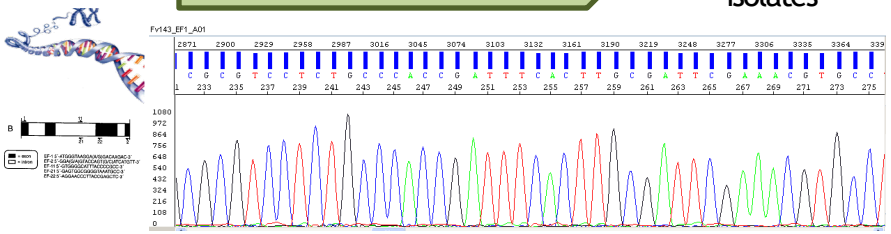


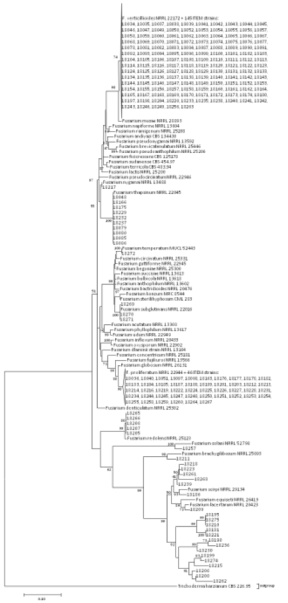
Maize sampling

10 Iranian provinces
182 maize samples
551 isolated strains

Molecular identification

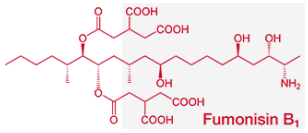
234 representative isolates



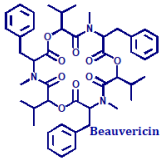


Mycotoxin analysis

104 representative isolates



- Fumonisins
- Beauvericin
- Enniatins



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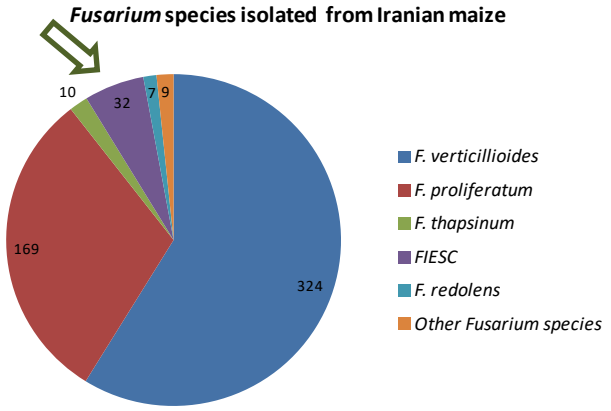
Fusarium species from Iranian maize

OUTCOMES

A wide sampling of maize kernels was carried out from 10 major maize-producing provinces of Iran. The prevalence of *F. verticillioides* (*Fv*) was generally observed. A n increase of *F. proliferatum* (*Fp*) incidence in Iranian maize was detected with, in some cases, a shift in *Fv*/*Fp* ratio towards *Fp*. FIESC species have been recorded for the first time in Iran. The diversity of *Fusarium* species isolated from Iranian maize highlights the possible increased risk of multi-toxin contamination.

Iranian Provinces	Number of Maize Sample	Number of *Fusarium* Isolates	*Fusarium* Species Occurrence (%)			Incidence * (%)		
			Fv	Fp	Other Species	*Fusarium* spp.	Fv	Fp
Alborz	30	126	47	48	5	21	10	10
Golestan	15	100	61	28	11	33	20	9
Qazvin	25	84	56	40	4	17	9	7
Fars	30	82	50	34	16	14	7	5
Khuzestan	24	62	74	0	26	13	10	0
Ardabil	20	43	81	12	7	11	9	1
Zanjan	12	27	78	18	4	11	9	2
Lorestan	10	11	18	55	27	6	1	3
Esfahan	10	9	78	0	22	5	3	0
Kermanshah	6	7	71	28	0	6	4	2
TOTAL	182	551	59	31	10	15	9	5

* Incidence was calculated as percentage of seeds infected on total analysed seeds.



Fumonisin producing strains	*F. verticillioides***	*F. proliferatum***			
	FB_1*	FB_1	FB_2	FB_3	Total FBs
N. positive strains/total	67/67	26/26	17/26	11/26	26/26
Range (µg/g)	79–2232	1–1860	0–466	0–11	1–2335
Mean ± SE (µg/g)	505 ± 38	216 ± 69	30 ± 18	3 ± 1	238 ± 442

* FB_2 and FB_3 were not detected in any *F. verticillioides* culture. ** For each mycotoxin, the number of positive strains on total analysed strains, and range and mean of production are reported.

Fallahi M., Saremi H., Javan-Nikkhah M., Somma S., Haidukowski M., Logrieco A.F., Moretti A. 2019. Toxins, 11, 297. DOI: 10.3390/toxins11050297

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