Preliminary analyses of 2014 Fusarium damaged kernels

Gursahib Singh

Fusarium head blight (FHB) of wheat

- Also called ‘scab’ or ‘tombstones’
- Caused by various toxigenic species
- In North America, *Fusarium graminearum* is the predominant species
- Results in Fusarium damaged kernels (FDKs) and mycotoxins

Susceptible stage: anthesis to the soft dough stage

Disease favoured by warm and moist weather

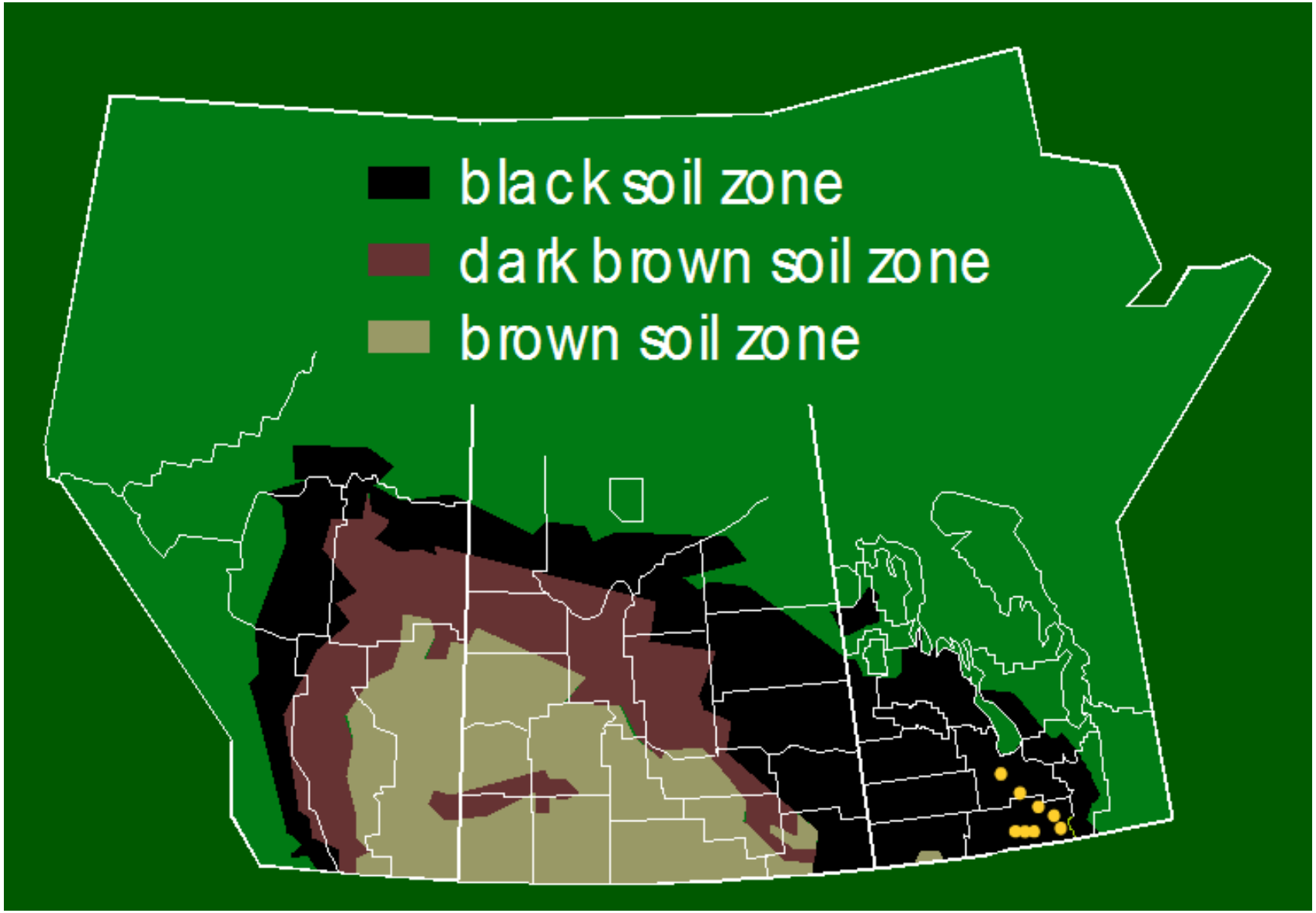
Diseased spikelets

- prematurely bleached
- rough and shriveled
- pink, light-gray, light-brown

F. graminearum chemotypes

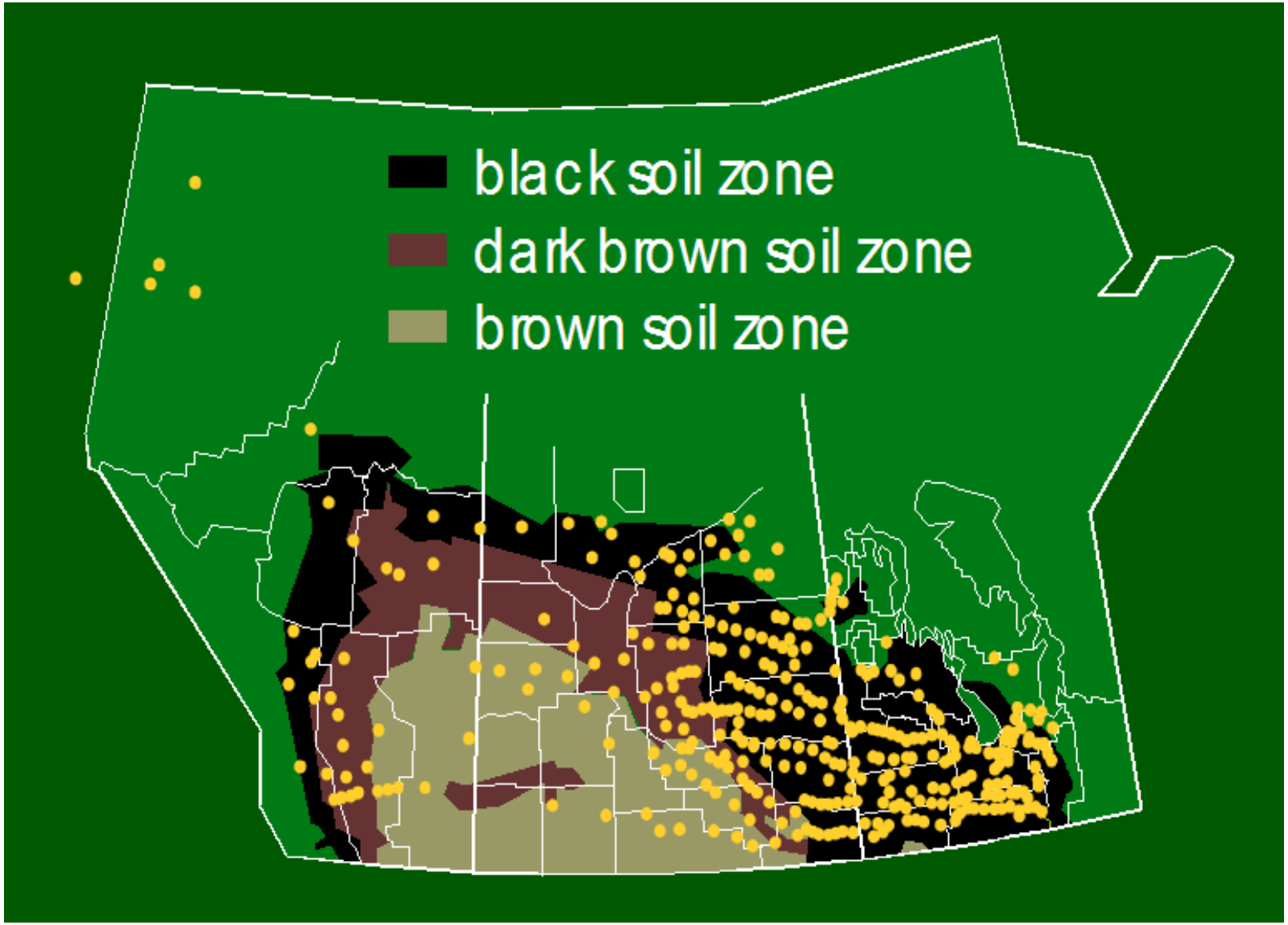
- Chemical phenotypes resulting from the major toxin produced
- Three major chemotype: NIV and DON (3-ADON, 15-ADON),
- Encoded by *TRI* genes
- Shift from 3-ADON to 15-ADON
- Predominating 15-ADON
- New chemotype discovered : **NX-2, NX-3**

Location of *F. graminearum* on the prairie, 1985



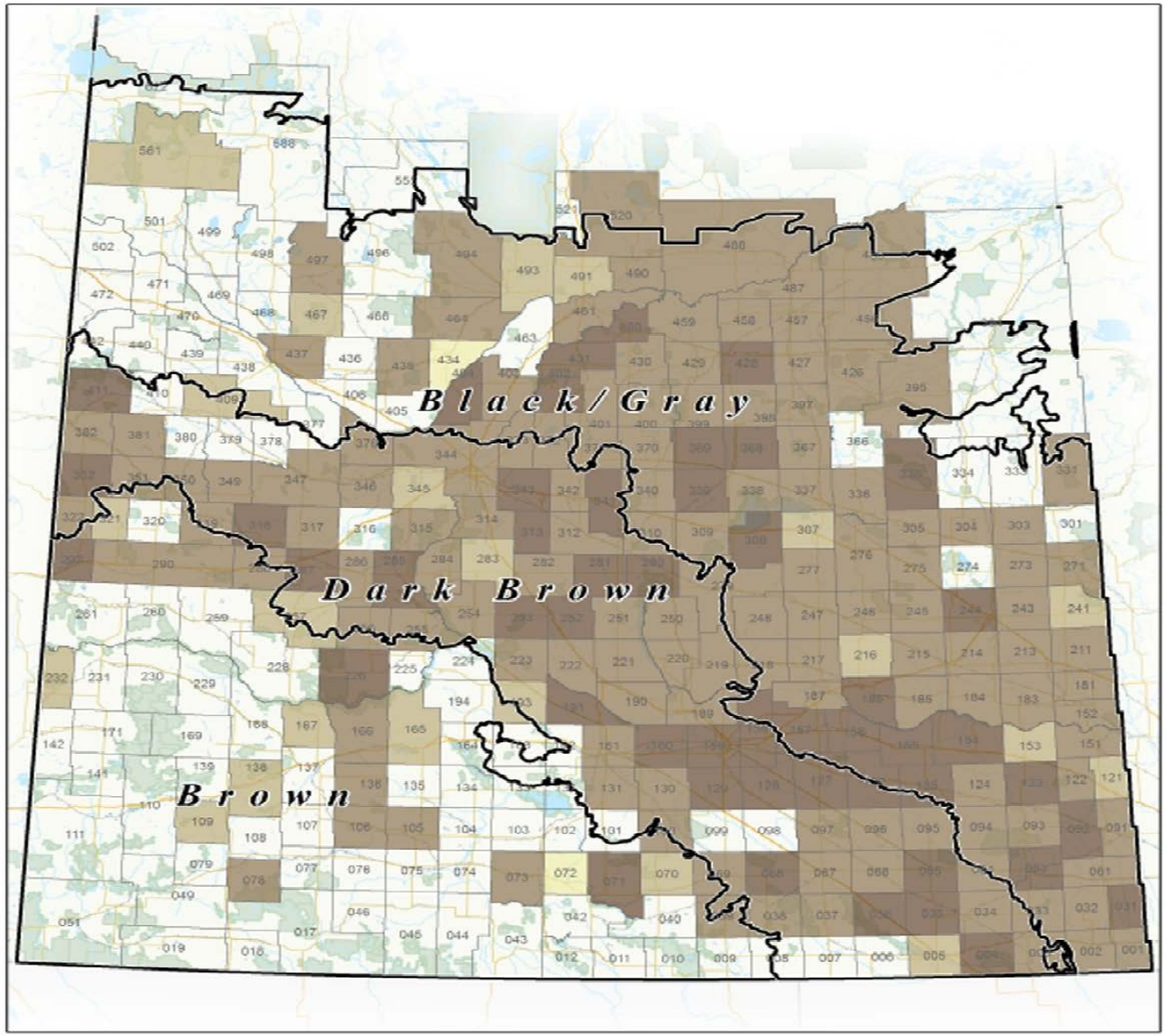
Randy Clear, Canadian Grain commission

Location of *F. graminearum* on the prairie, 1998



Randy Clear, Canadian Grain commission

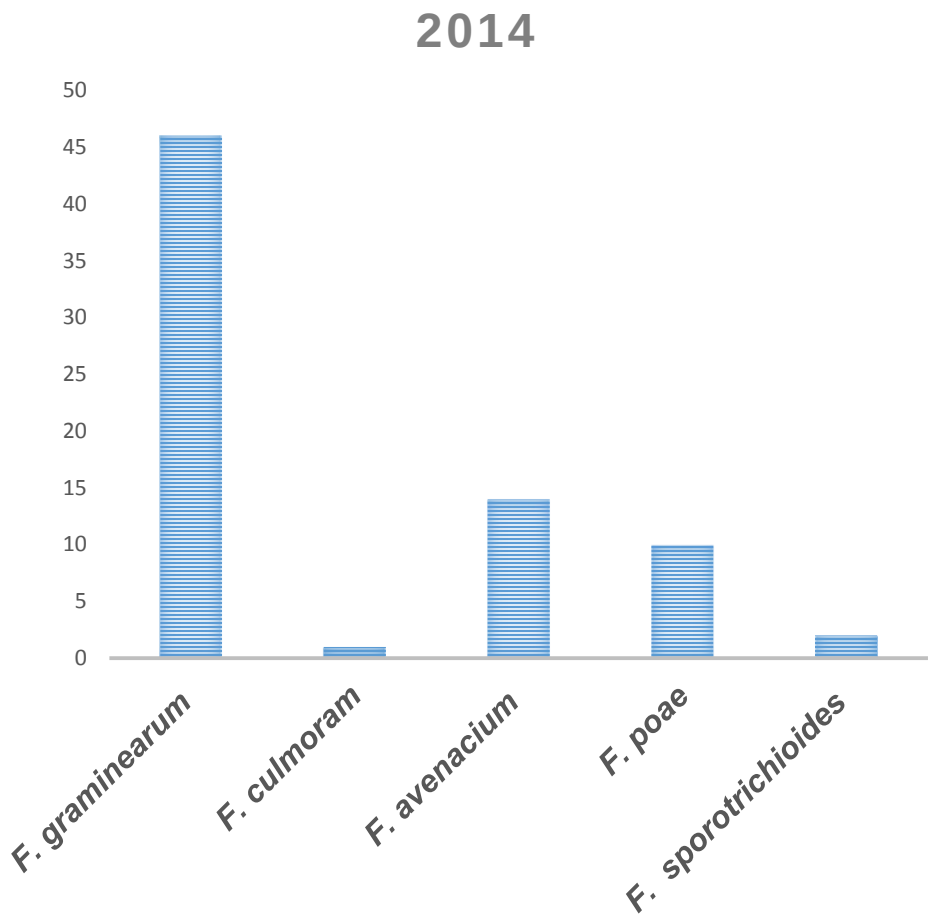
F. graminearum in Saskatchewan (2014-2015)

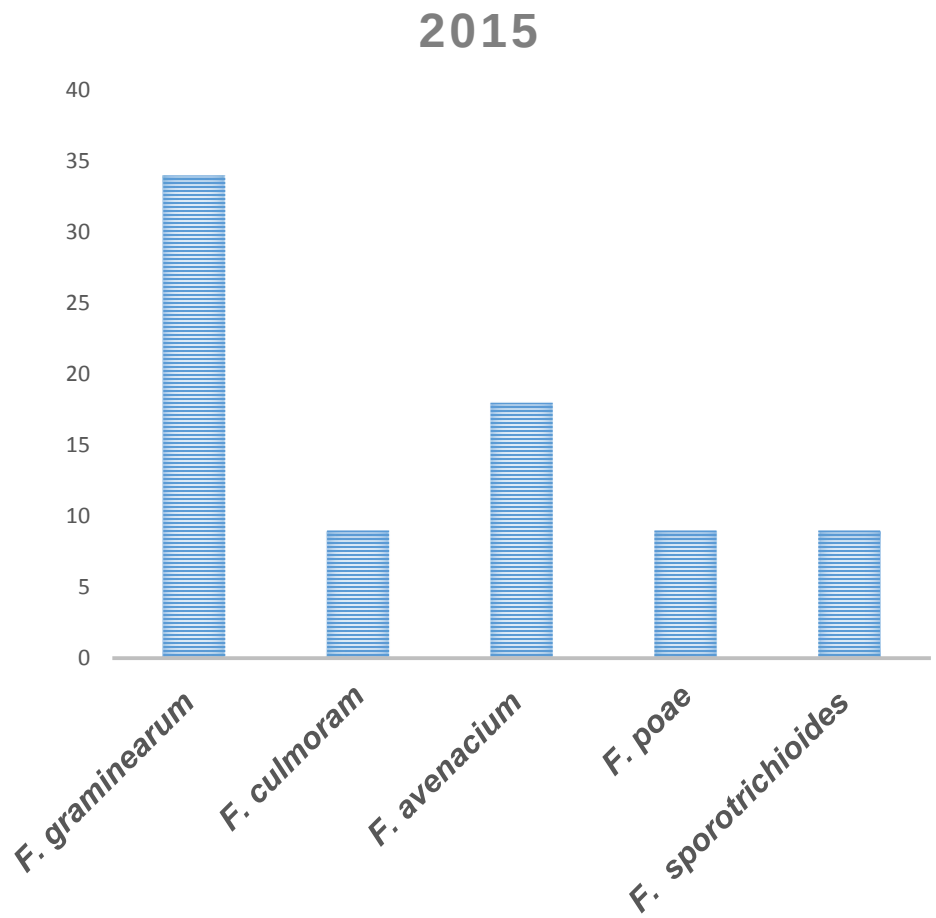


Year	FHB severity (%)	
	Common wheat	Durum wheat
2011	0.6	0.9
2012	1.2	0.9
2013	0.5	1.8
2014	0.5	1.8
2015	2.2	5.5

CPDS- reports 2014-2015

Fusarium species prevalent in Saskatchewan (2014-2015)





CPDS- reports 2014-2015

Species involved in 2014 Epidemic

FDK's-SCIC

Threshed and grinded

DNA extraction

Primers and TaqMan probes (Yli-Mattila et al. 2008)

Real-Time PCR

Fusarium spp.	**RT-PCR Method (No. of crops)**	
	>0.001[b]	**>0.10[b]**
F. avenaceum	50	47
F. culmorum	45	8
F. graminearum	50	50
F. poae	49	22
F. sporotrichoides	1	0

[b]-Fusarium DNA/Extracted DNA (pg/ng).

Conclusions

- *F. graminearum* and *F. avenaceum* was a major culprit
- Westward spread of FHB in past two decades
- High FDKs were present in most of the samples

Future work

- *Fusarium* chemotype characterization: 3-ADON, 15-ADON, NIV and NX-2

- Toxin quantification (ELISA)

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