

Increasing sunn pest damage threshold level by using strong gluten genotypes; combining vegetative stage tolerance and strong gluten



Mesut Keser, ICARDA, Turkey

Yaşar Karaduman, TZARI, Eskisehir, Turkey

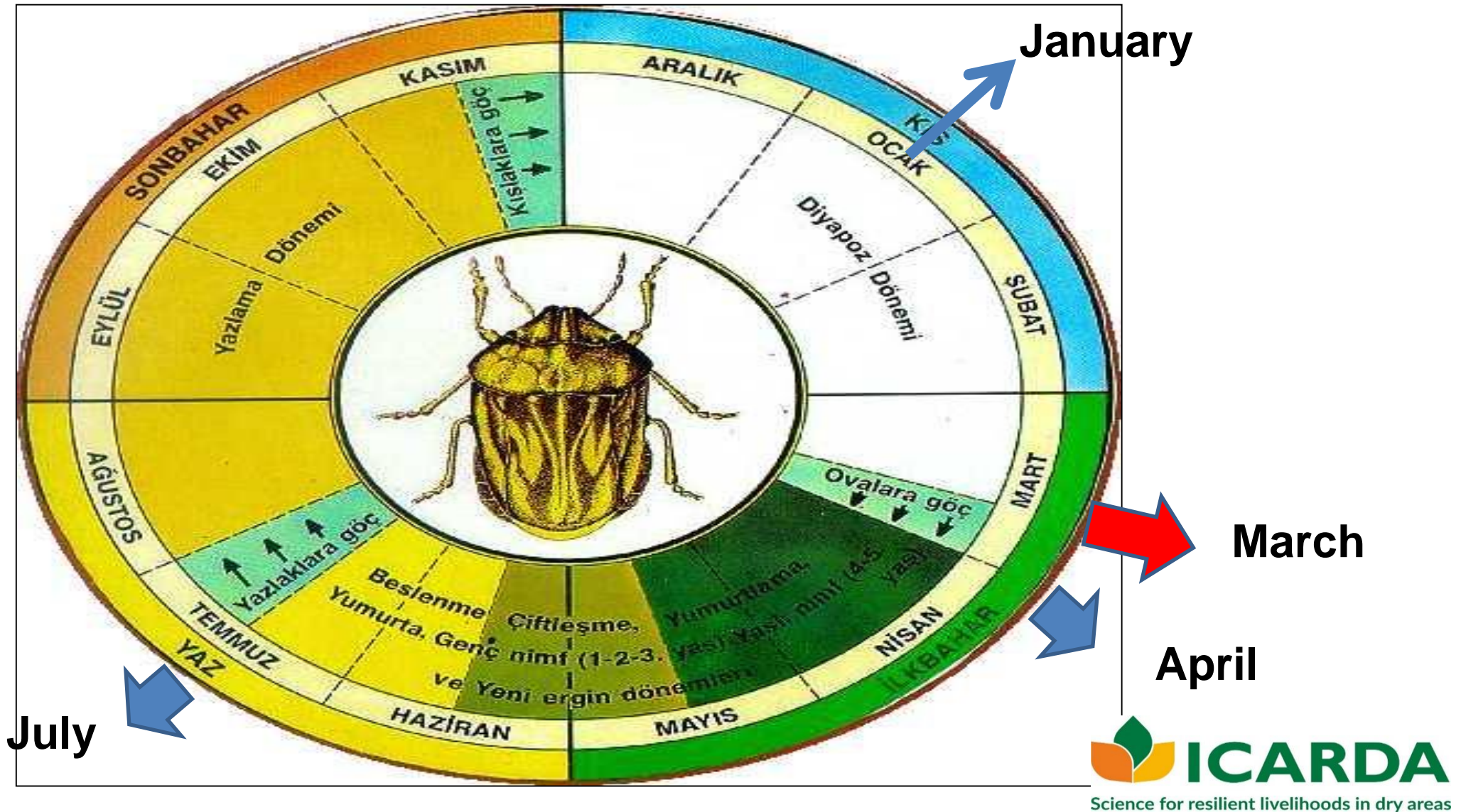
Mustafa Cakmak, TZARI, Eskisehir, Turkey

Alex Morgounov, CIMMYT, Turkey

Fatih Ozdemir, BDIARI, Konya, Turkey



Sunn pest; 1 year life cycle



Sunn Pest in Turkey

1- *Eurygaster integriceps*:

South -South east and Thrace regions of Turkey



2- *E. maura*:

Central Anatolia



3- *E. austriaca*:

Rare



Chemical application in Turkey to Control Sunn pest

Year	Area evaluated (000 ha)	Chemical applied (000 ha)
2011	2.100	686
2012	4.100	1.036
2013	4.000	902
2014	3.217	646 (433 not applied)
2015	3.962	410 (628 not applied)
2016	4.350	578 (198 not applied)



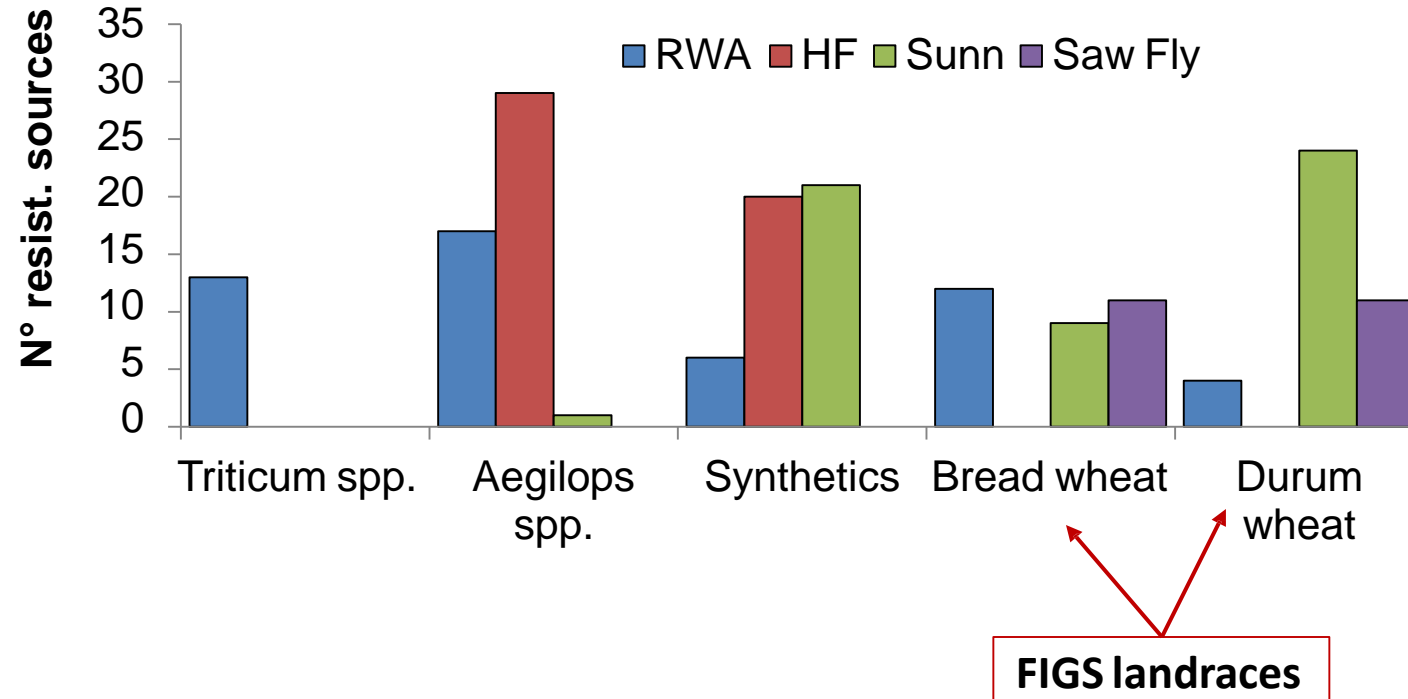
Sunn Pest damage and controlling it

Objectives

No	Objective	Activity
1	<ul style="list-style-type: none">• to determine the genetic diversity in WW pool• To identify res/tol genotypes	evaluating the germplasm against sunn pest tolerance in vegetative stage
2	<ul style="list-style-type: none">• To determine the sunn pest threshold damage level in Strg Glu. material	Evaluating the strong gluten germplasm for sunn pest damage
3	<ul style="list-style-type: none">• To combine Veg stage tolerance and strong gluten• To transfer Veg Stage Tol to currently grown cultivars	Making crosses



WHEAT Sources of resistance to pests in the ICARDA Genebank

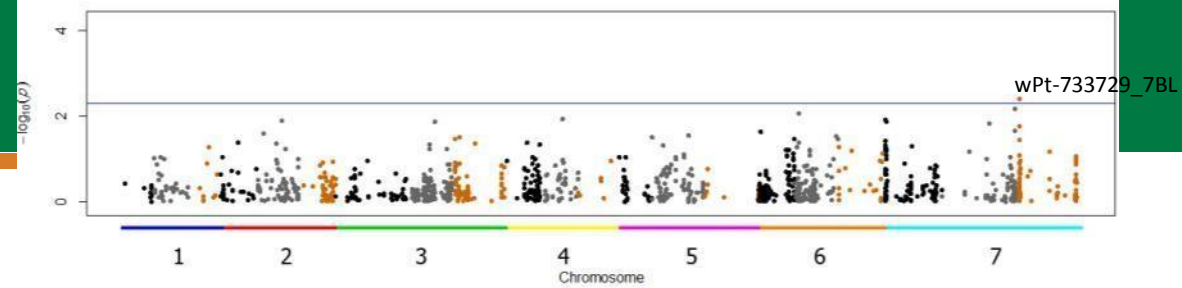


Bouhsinniet al2009.
Genet. Res Crop Ev.



RWA_LC

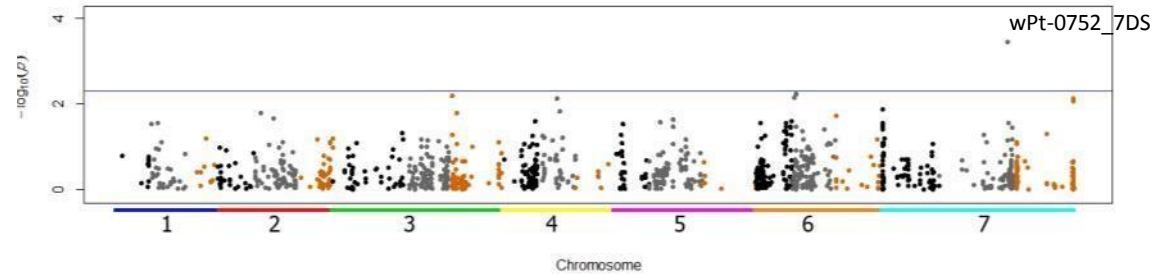
Unmapped associated markers: 1- wPt-731493_3D



RWA_LR

Unmapped associated markers:

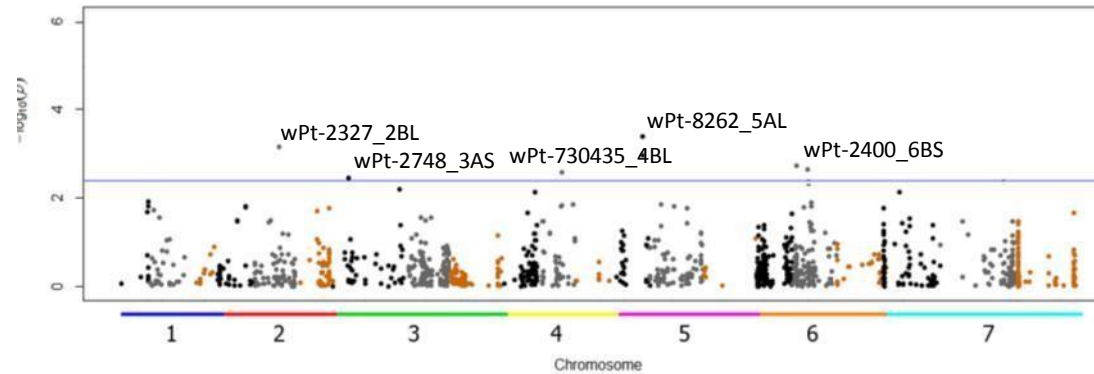
- 1- wPt-665259_1A
- 2- wPt-9605_1BL
- 3- wPt-5934_2B
- 4- wPt-731493_3D



SP_VDS

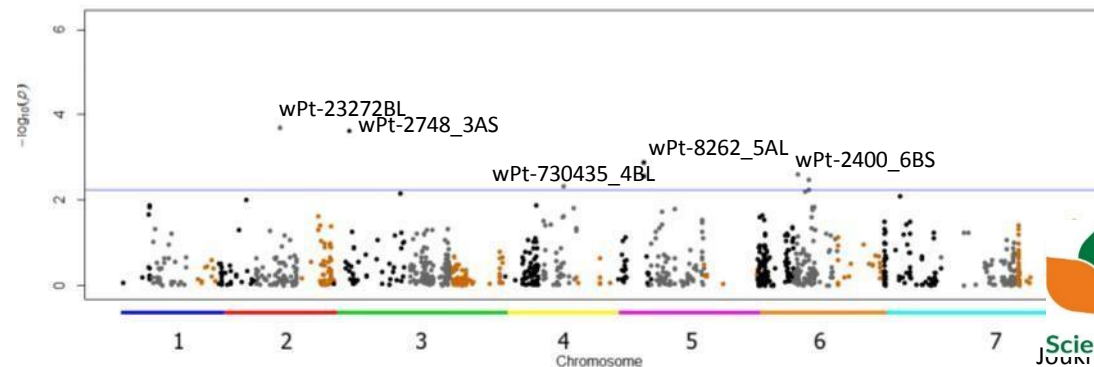
Unmapped associated markers:

- 1- wPt-5776_1A
- 2- wPt-2861_1BL



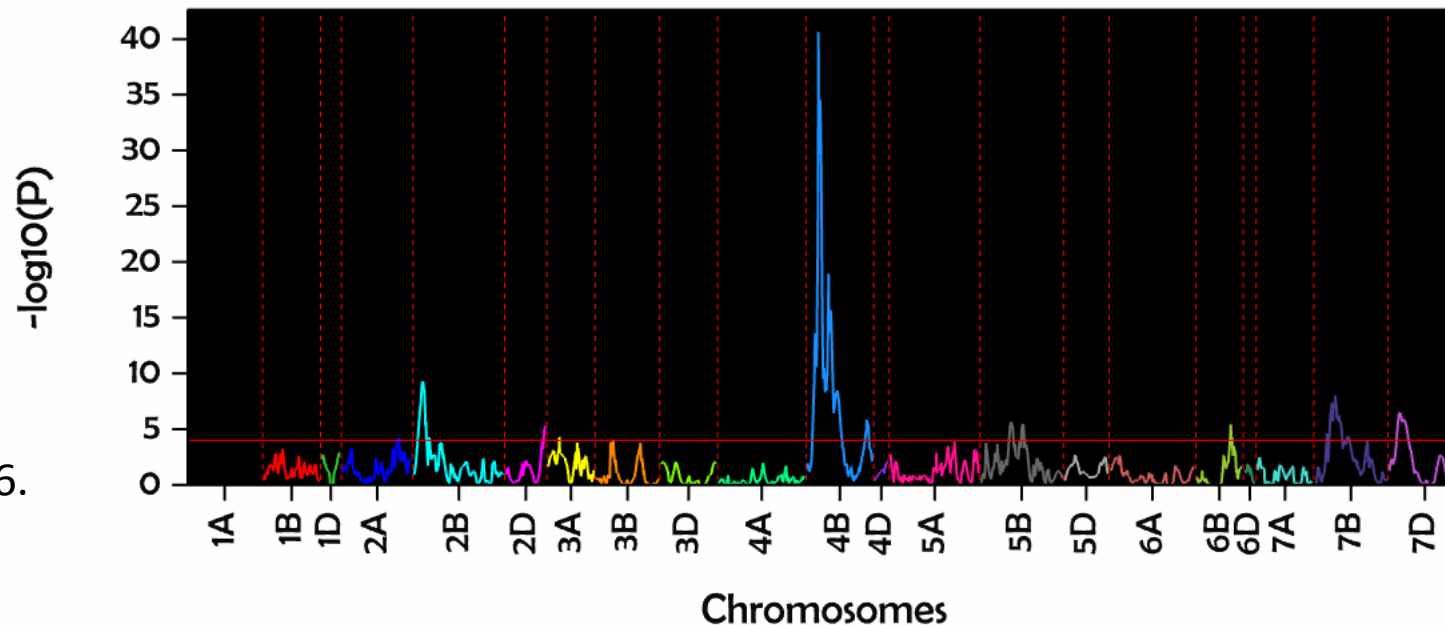
SP_VIS

Unmapped associated markers: 1- wPt-5776_1A
2- wPt-2861_1BL



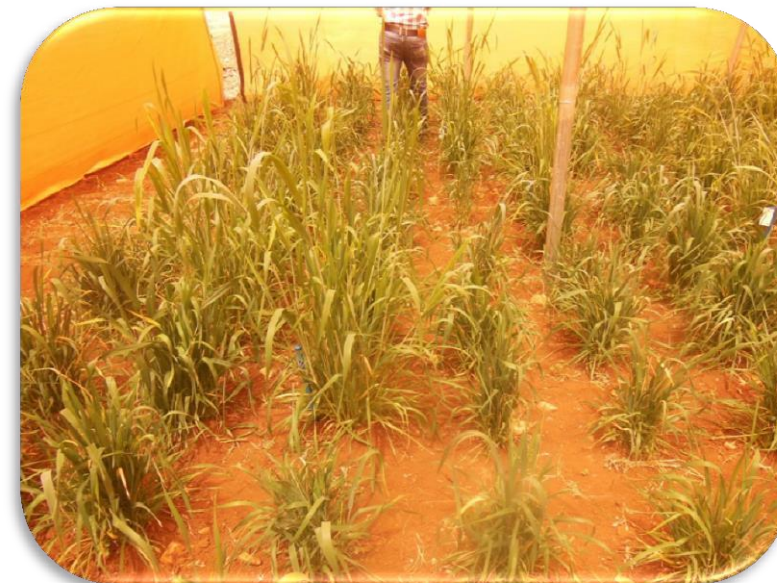
Joukhadar et al.
2013.Mol.Bree

A major **locus** is **identified** associated with **resistance** to **Sunn Pest** feeding at the **vegetative stage**. The locus, designated as **qSP1**, is located on the short arm of **chromosome 4B**, This is the **first report** of a genetic locus associated with resistance to Sunn pest in wheat



Emebiri et al. 2016.
TAG

Identified 3 synthetic hexaploid wheat lines with **combined resistance to Hessian Fly and Sunn pest**. This is the first report of combined resistance to these two pests.



In collaboration with Spring Bread Wheat Program at CIMMYT-Mexico, 12 synthetic lines resistant to **Sunn pest at vegetative stage.**



Material (WFW)

	Group	# of material
1	Esk Demo Plots	43
2	12CBWF	131
3	HistIrr	5
4	HistSA	6
5	Synthetic	6
6	SunnPest RN	9 (Repeated)
Total		212



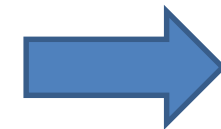
12



Sunnpest damage in the cage (%)

2012

66,87	67,65	57,89	62,42	60,8	54,36	58,33		45,95	37,55	31,15	31,61	20,69	52,35	31,15	51,46	30,57	48
61,11	49,63	41,11	41,56	34,48	28,09	32	40	20,37	22,98	48,48	58,24	67,8	30,3	33,9	32	52	35,42
26,11	26,11	13,27	15,89	22,64	17,54	21,78	22,89	30	10,42	19,61	22,22	26,03	13	33,9	34,58	19,8	39,53
42,86	27,78	18,64	13,25	9,231	21,82	11,76	13,79	30,95	39,81	47,37	32,26	20,83	15,25	39,47	15,79	23,08	45
52,2	27,45	10,55	17,12	15,66	20,93	24,41	10,39	25	19,74	21,62	20	15,84	29,31	22,5	29,82		37,65
50	37,5	13,16	26,87	30,77	47,22	34,94	25,33	49,15	21,54	18,94	26,88	40	26,09	18,64	29,23	20,53	32,35
53,85	36,73	23,81	32,53	24,36	34,57	40,85	18,75	33,66	23,46	32,67	9,259	34,33	24,05	28,74	39,71	30,7	46,43
10,13	18	25	50	53,13	51,94	26,44	26,39	60	46,73	45,74	34,71	33,78	26,71	23,48	35,94	24,66	42,31
34,62	42,86	11,41	20	12,37	29,46	38,31	47,83	46,48	71,74	36,28	20,93	29,07	31,48	29,27	40,38	29,11	45,53
40,48	25,97	13,04	7,692	16,92	23,4	22,12	23,53	23,94	12,68	24,44	7,143	19,64	10,53	27,78	27,27	34,48	42,07
36,11	20,97	18,03	11,11	37,5	18	26,14	18,37	24,75	21,95	12,2	27,42	28,57	13,67	8,889	23,91	20	33,58
39,13	39,39	35,04	11,76	42,11	35,64	31,91	13,38	10,37	25,74	34,81	26,26	23,46	18,81	20,9	17,65	16,48	26,97



North

<10

11--20

21--30

31--40

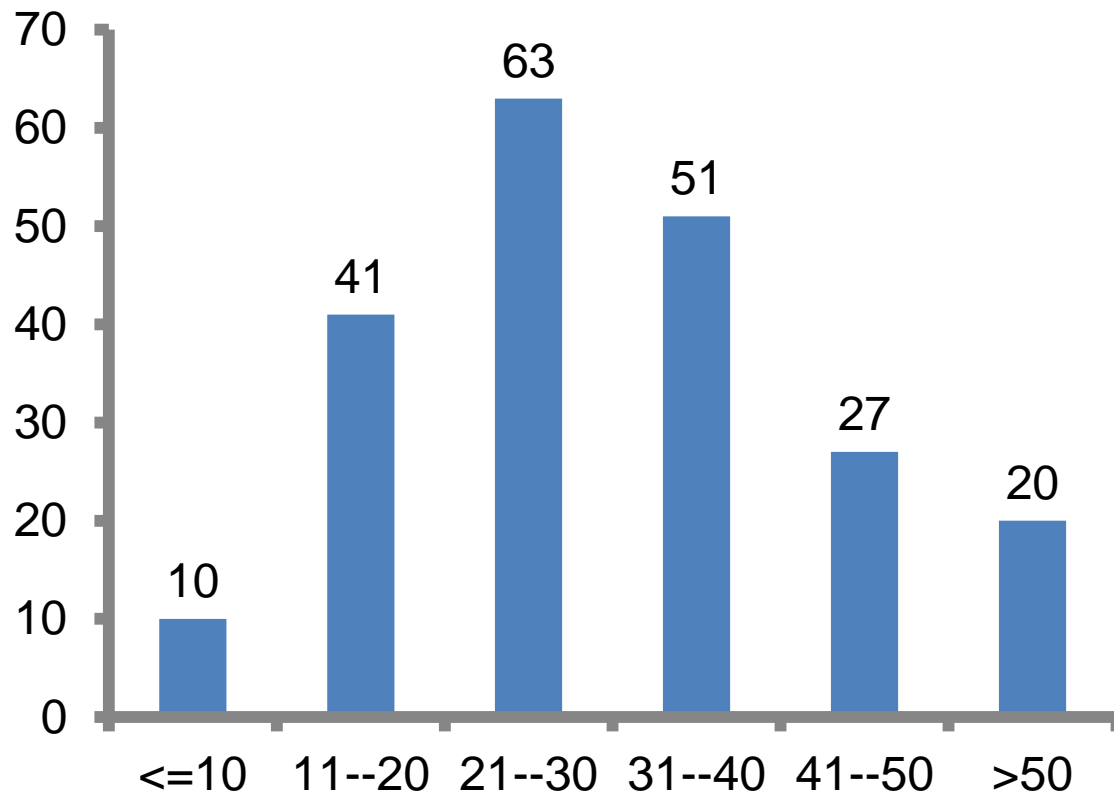
41--50

>50

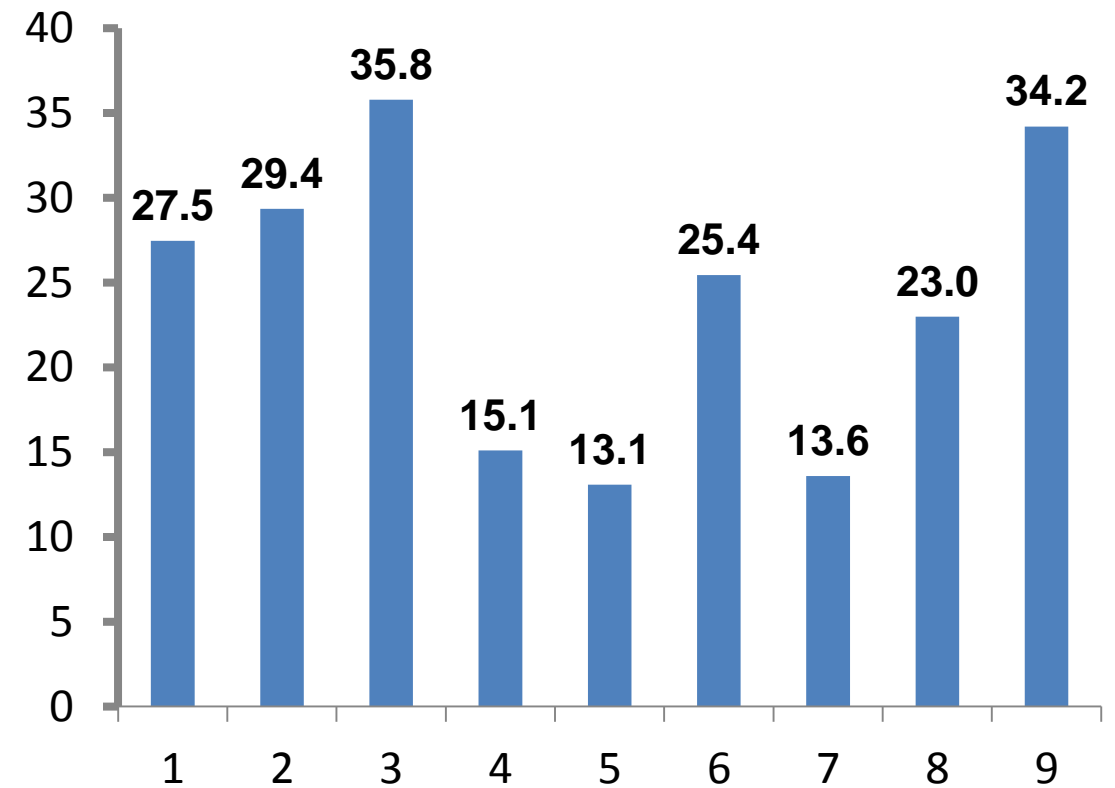


lines with Sunnpest damage 2012

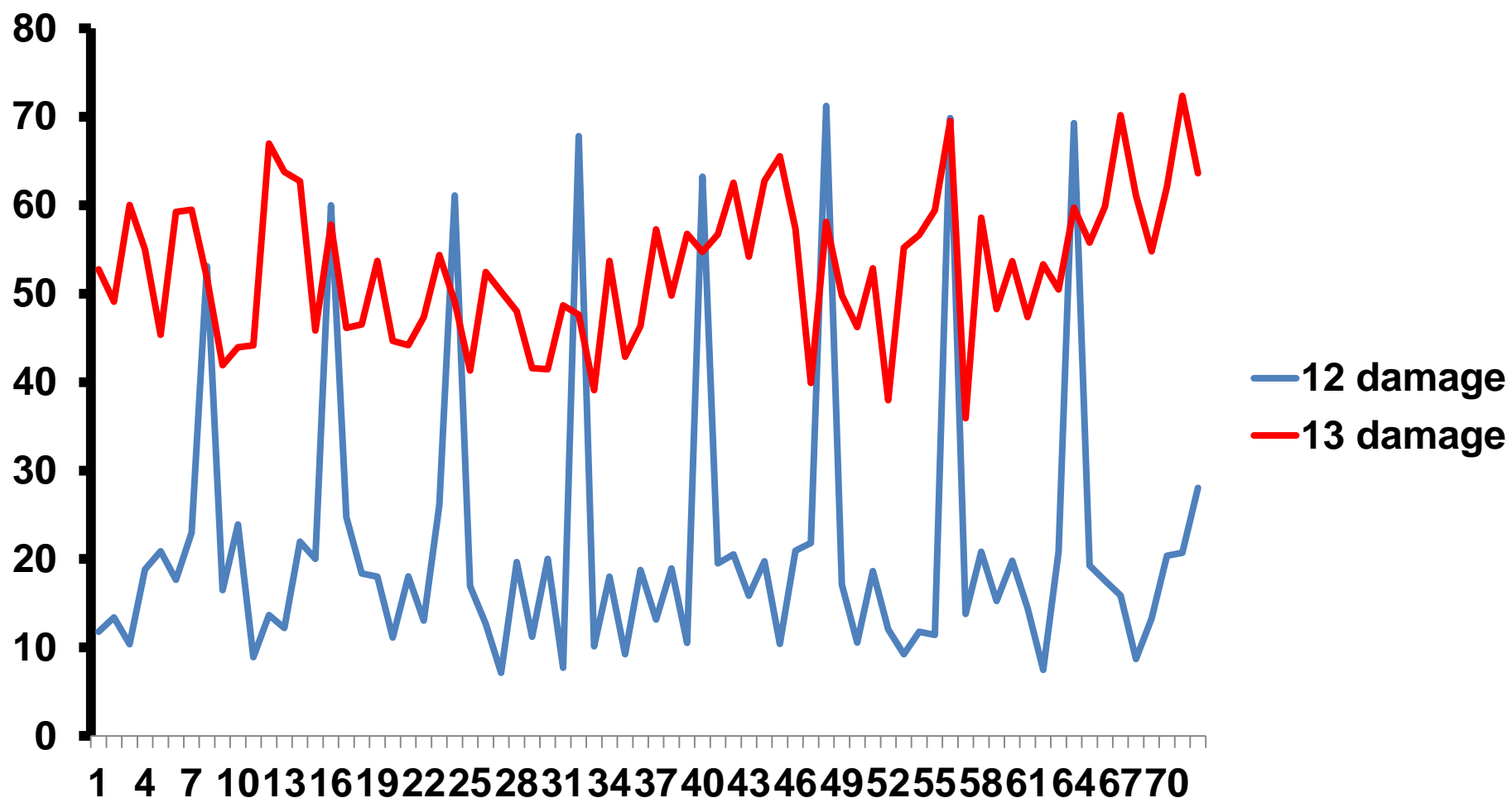
Number of lines



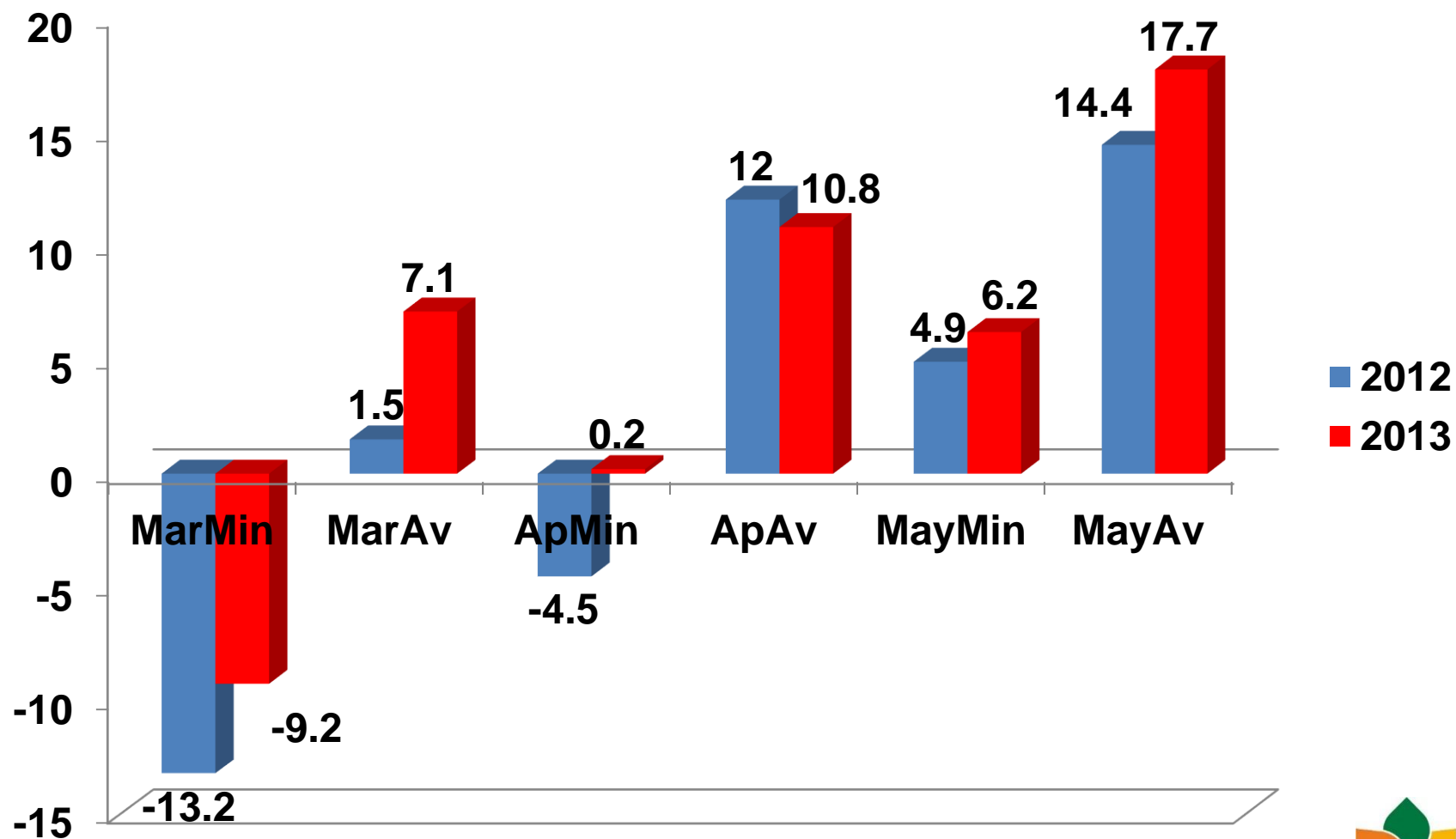
Res Lines (% damage)



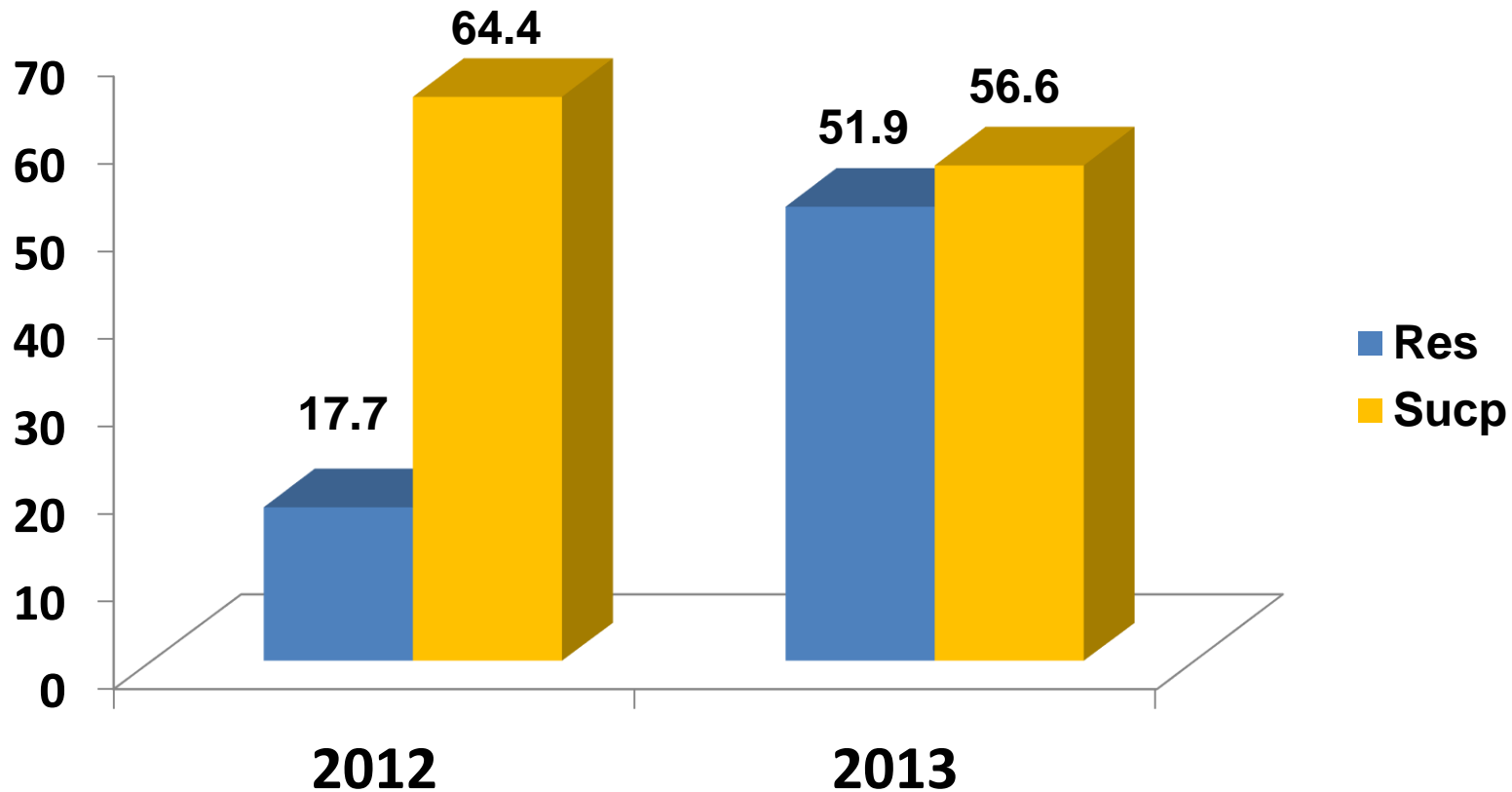
2012 vs 2013 Sunn Pest damage



Min. and Average temperatures in 2012 and 2013



Mean Damage of Res. vs Susc. 2012 and 2013



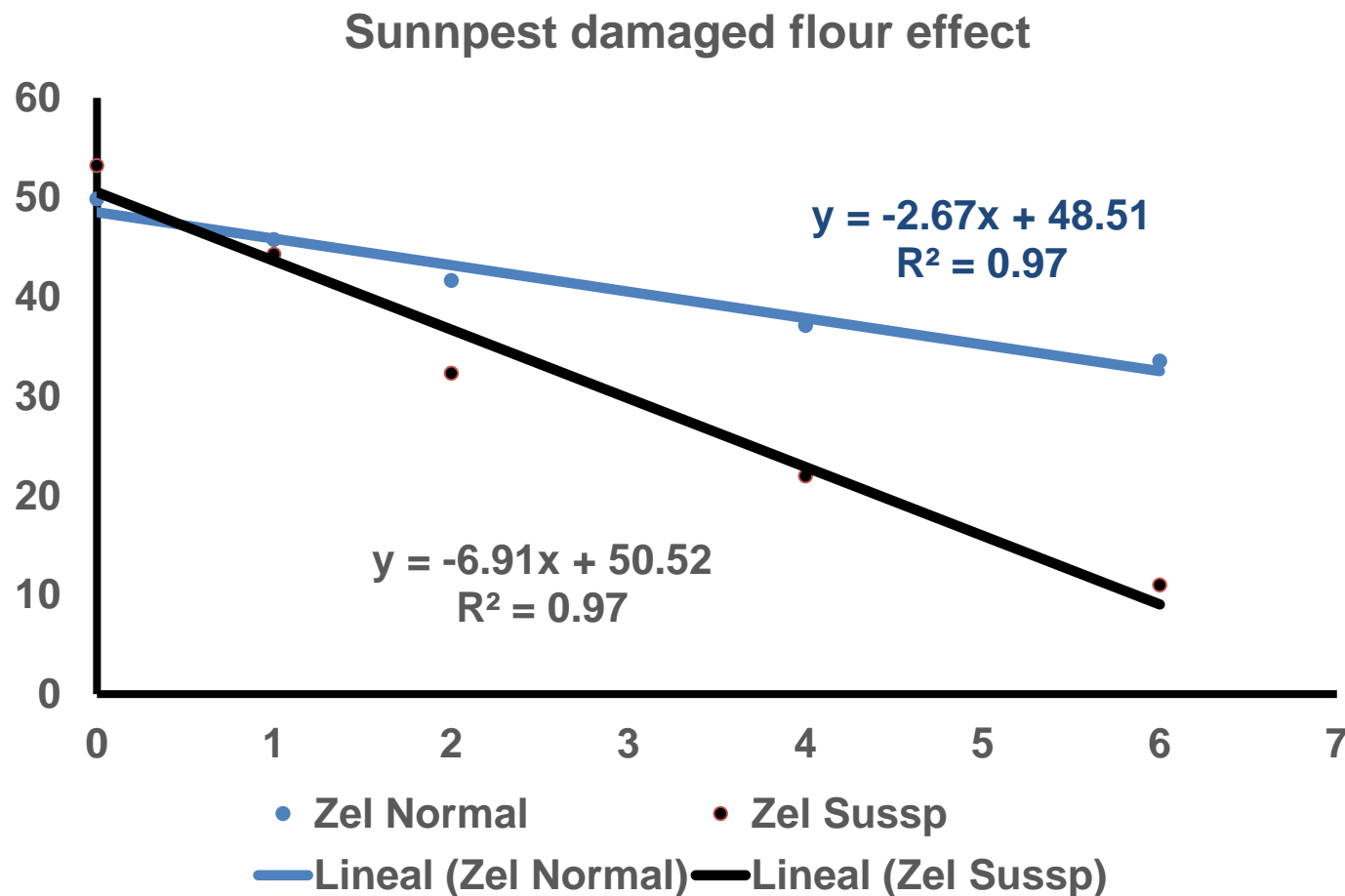
Material (Strong Gluten Genotypes)

Entry	CNAME	OC
1	SELYANKA	UKR
2	KUJALNIK	UKR
3	VICTORYA	UKR
4	ST.ERYHTR 894-07	UKR
5	Bezostaja1	
6	ST.ERYHTR 1157-08	UKR
7	ST.ERYHTR 1158-07	UKR
8	ST.ERYHTR 1282-08	UKR
9	ST.ERYHTR 1287-08	UKR
10	Çetinel2000	
11	ST.ERYHTR 1290-08	UKR
12	ST.ERYHTR 1329-08	UKR
13	ST.ERYHTR 1334-07	UKR

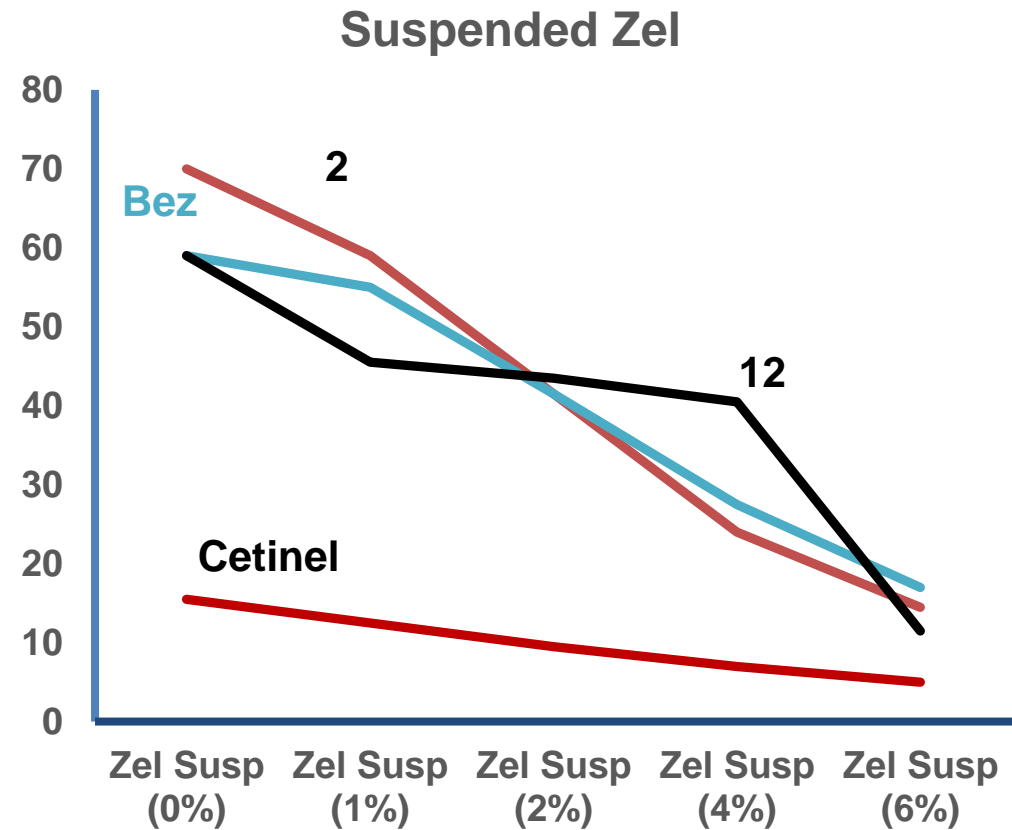
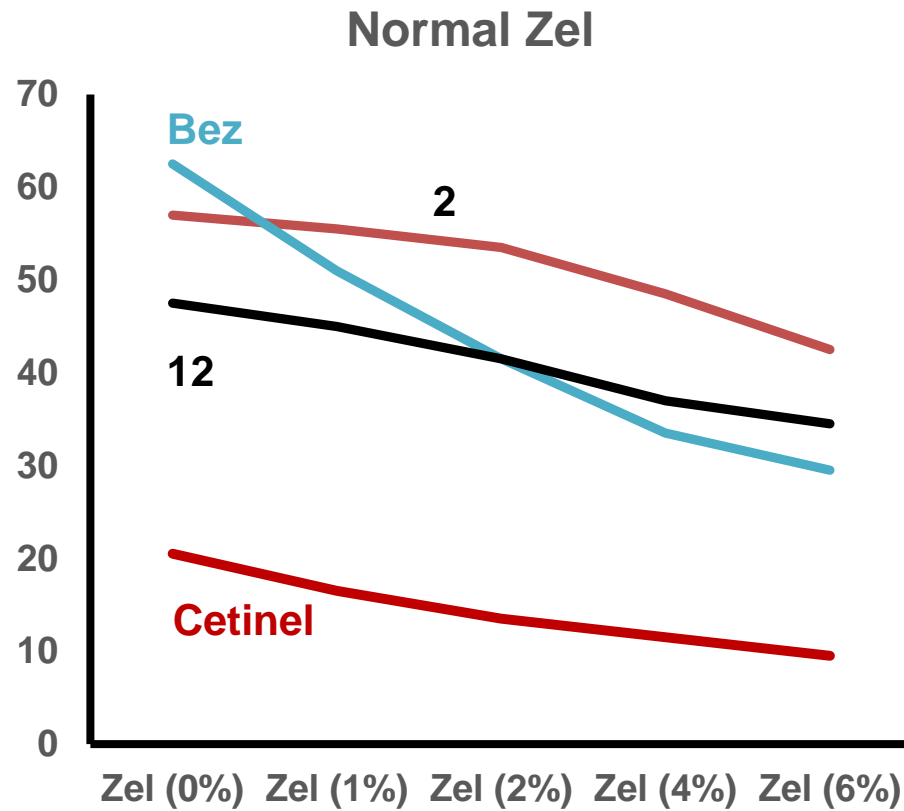
Flour preparation

No	%	Remarks
1	0	Control
2	1	% of SunnPest damaged flour
3	2	% of SunnPest damaged flour
4	4	% of SunnPest damaged flour
5	6	% of SunnPest damaged flour

Overall effect of Sunnpest damage



Normal Zeleny vs Suspended Zeleny test Bez and Cetinel vs Str. Glu



Combining Strong Gluten and Veg. Stage Tolerance

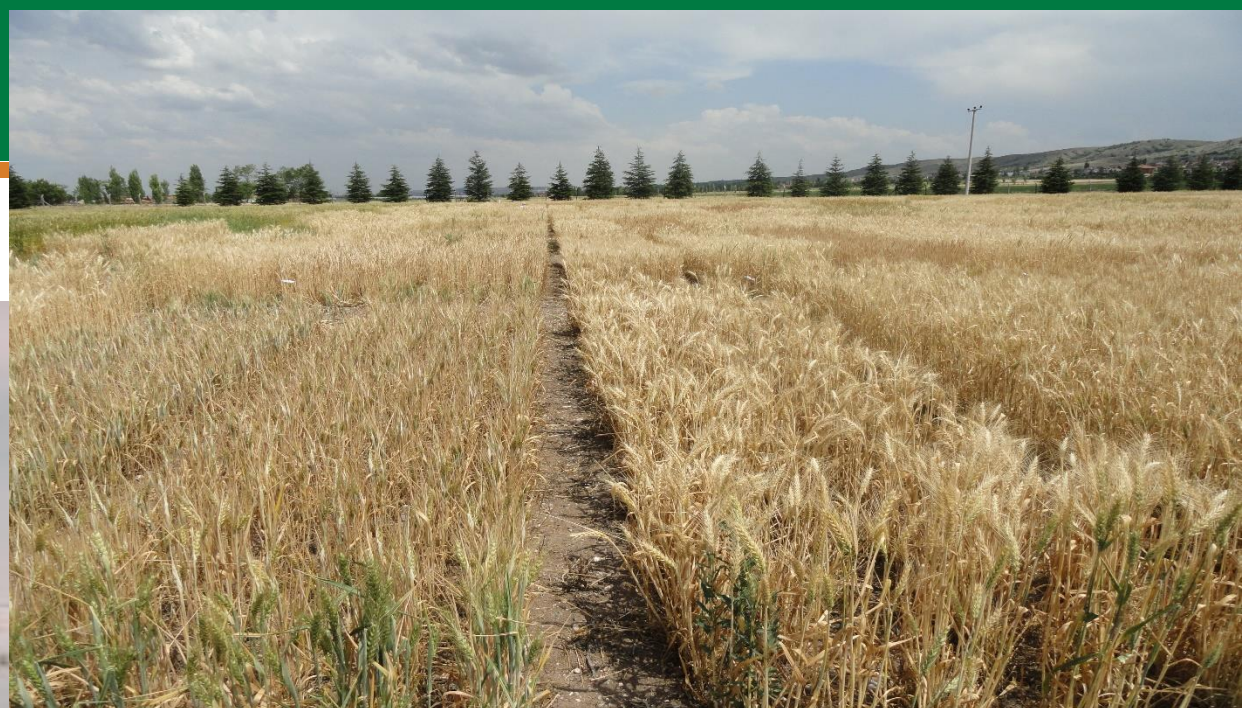
No	CID	Parents	used as parent	spikes
1	SELYANKA/IG-139835	ICBW-209273	4	52
2	SELYANKA/IG-139770	IG-139558	1	39
3	KUJALNIK/IG-139835	IG-139770	5	31
4	VICTORYA/IG-139770	IG-139835	3	46
5	VICTORYA/IG-140411	IG-140368	1	31
6	VICTORYA/ICBW-209273	IG-140411	1	39
7	ST.ERYHTR 894-07/IG-139770	KUJALNIK	1	41
8	ST.ERYHTR 894-07/IG-139558	SELYANKA	1	39
9	ST.ERYHTR 894-07/ICBW-209273	ST.ERYHTR 1157-08	2	41
10	ST.ERYHTR 894-07/IG-140368	ST.ERYHTR 1282-08	1	43
11	ST.ERYHTR 1157-08/IG-139770	ST.ERYHTR 1290-08	1	41
12	ST.ERYHTR 1157-08/ICBW-209273	ST.ERYHTR 894-07	4	31
13	ST.ERYHTR 1282-08/IG-139770	VICTORYA	1	28
14	ST.ERYHTR 1290-08/IG-139835			33
15	ST.ERYHTR 1290-08/ICBW-209273			32
		Total		567

- Spikes collected from F5
- Spikes divided into two
- 1 set planted in Terbol, Lebanon at ICARDA; screening for Spest Tol under cages by M. Bouhsinni
- 1 set planted in Ankara for other evaluations.

Study of Gluten (diversity and impact)

No	CID	Genotoype/ population	Traits
1	SELYANKA/GRK79	149	Str.Glu/Weak
2	ST.ERYHTR 1158-07/SONMEZ	148	Str.Glu/Med. StrgGlu
3	ST.ERYHTR 1282-08/PEHLIVAN	156	Str.Glu/Med. StrgGlu
4	ST.ERYHTR 1287-08/BEZ	150	Str.Glu/Str.Glu
5	KUJALNIK/KIRAC	153	Str.Glu/Str.Glu
	Total	756	

- Planted in Eskisehir, Turkey
- Diversity analysis
- Biparental pop.
- Quality analysis



Acknowledgement

- IWWIP is supported by CRP WHEAT and Turkish Gov.
- GDAR, Turkey
- Institutes
- IWWIP Cooperators all over the world
- CIMMYT
- ICARDA
- Many more...

Thank you