

DETECTION OF SUNN PEST TOLERANCE IN WHEAT VARIETIES IN CENTRAL ANATOLIAN PLATEAU

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The Objectives of the Project

1. to determine the important of Sunn pest tolerance in both durum and bread wheat varieties of CAP in Turkey

**Sunn pest (*Eurygaster* spp.,
Heteroptera scutelleridae) is a very
important insect in Turkey.**

**Create big damage to wheat and
barley production.**

Economical losses of up to 30%.



Chemical and biological methods were used to control sunn pest in Turkey.

According to literatures some varieties are more tolerant than the others.

For that reason, this project was initiated to find alternatives to control sunn pest by finding a good tolerance germplasm

Literature Summary

2003

Chemicals were used for an area of 18.803. ha

Spent: 12.700 000 \$/year

Saved: 1.200 000 000 \$/year

(Anonymous 2003).

Sunn pest damage wheat quality

Estimates up to 40.000.000 \$/year

Materials and Methods

- Under tent (started 2005'de)
- Ankara' 20, Diyarbakır' 14 materials
- Field condition (2005')
- Ankara' 73, Trakya' 45, Konya' 20 materials
- Big field areas, (2005') Diyarbakır' 7, Ankara' 8, Eskişehir' 5, Trakya' 6, Konya' 8 materials

Observations

- **Growing type**
- **Plant Growth behavior**
- **Glaucosity of flag leaf and spike.**
- **Stem type (cut the stem)**
- **Number of grain/spike**
- **Density of spike**
- **With and without awn**
- **Leaf color**
- **Grain color**



Observations

- **Grain hardness**
- **Plant height**
- **Heading date**
- **Milk stage of grain**
- **Maturity**
- **Tillering time**

Counting and Analysis

- Number of sunn pest
- % of damaged kernel
- Quality analysis
 - SDS
 - Weighting SDS
 - Protein percentage
 - Hectoliter weight

Entomological Methodology

1- Tent :

- Sunn pests were collected from the field after they moved from the mountains.
- Then kept one week inside reserved tent before placed in test tent (3 Adult/m²).
- At harvest time the tent was taken and Adult and Nimf sunn pest numbers were counted.
- Tiller number of plant and number of grain per spike in 1m² were counted
- 1000 Kernel weight damage was evaluated as %.

2- Field research

- ➔ 20, 30 m² areas with 4 replications.
- ➔ All observations were taken on plant
- ➔ Quality analyses done in lab

3- Big Field research

- ➔ Each variety planted in a 1 ha area with 4 replications.
- ➔ After 7 days number of sunn pest was counted in (4 counting 50cm x 50cm area) Adult, young sunn pest and egg parasited counted).
- ➔ Also 2,8 kg Seed sample send to lab for further testing.

About research

FIELD CROP R.İ ANKARA



1-Tent

a) 2x2x2m, 20 varieties (12 breed + 8 durun) number of sunn pest, damaged kernel, and Quality test.

b) 4x6 m, 50 varieties in one tent, no. sunn pest, damaged kernel no. Quality.

2-Field

50 x 2,4m

73 varieties

Previous mentioned observations were taken.

No. sunn pest.

3-Big Field

3 da, 8 varieties.

observation taken.

No. sunn pest.

BEETWEEN 2004-2006 SUNN PEST TENT TRIAL (BREAD WHEAT)

	S.P(2005)	S. P. (2006)	D.K. (2005)	D.K. (2006)	S.P. AVE.	D. K. AVE.
Bezostaya	46,5 de	113,3 bc	2,8 d	4,7 de	79,9	3,8
Gerek	59,0 bcd	199,8 a	6,8 bc	10,6 a	129,4	8,7
Dağdaş	21,8 f	96,8 bc	4,5 cd	6,2 b-e	59,3	5,4
Pehlivan	19,0 f	62,8 c	2,4 d	2,8 e	40,9	2,6
Gün-91	41,5 def	75,5 c	4,6 cd	5,0 cde	58,5	4,8
İkizce 96	90,3 a	132,3 abc	4,9 bcd	8,9 abc	111,3	6,9
Zencirci	81,6 ab	64,7 c	10,7 a	3,1 e	73,2	6,9
Demir 2000	72,3 abc	91,2c	3,8 cd	7,6 a-d	81,8	5,7
Bayraktar	96,3 a	87,5 c	2,9 d	10,0 ab	91,9	6,5
Tosunbey	49,8 cde	90,5 c	2,9 d	8,2 a-d	70,2	5,6
Kınacı	33,6 ef	124,8 abc	8,6 ab	4,5 de	79,2	6,6
Harmankaya	64,0 bcd	175,5 ab	12,3 a	3,3 e	119,8	7,8
AVE.	56,3	109,5	5,6	6,2	82,9	5,9
LSD.	24,3	79,6	3,8	4,0		
CV(%)	22,3	37,65	34,6	33,18		

BREAD WHEAT

LOW DAMAGED VARIETIES

	Dam.	Har	Ear
➤ PEHLIVAN	(2.6)	MH	E
➤ BEZOSTAYA	(3.8)	MH	ME
➤ GÜN-91	(4.8)	MH	E
➤ DAĞDAŞ	(5.4)	H	ML
➤ TOSUNBEY	(5.6)	MH	E
➤ DEMİR-2000	(5.7)	MH	ME

HIGH DAMAGED VARIETIES

	Dam.	Har	Ear
❖ GEREK	(8.7)	S	ME
❖ HARMANKAYA	(7.8)	S	ML
❖ İKİZCE-96	(6.9)	MS	ME
❖ ZENCİRCİ	(6.9)	MS	E
❖ KINACI	(6.6)	MS	ME
❖ BAYRAKTAR	(6.5)	MS	E

2005-2006 SUNN PEST

(Bread wheat)

Varieties	SunPes Nu	Dame.Kern(%)	SDS	Wait Sds (30 min)	Protein %
Bezostaya	113,3 bc	4,7 de	33,0 ab	10,5 a	13,2 a
Gerek	199,8 a	10,6 a	19,0 f	5,0 f	12,9 ab
Dağdaş	96,8 bc	6,2 b-e	21,5 ef	11,0 a	13,1 a
Pehlivan	62,8 c	2,8 e	19,0 f	6,0 def	10,3 g
Gün-91	75,5 c	5,0 cde	29,0 bc	10,0 ab	11,7 de
İkizce 96	132,3 abc	8,9 abc	27,5 bcd	5,0 f	12,0 cde
Zencirci	64,7 c	3,1 e	24,8 cde	9,0 abc	10,8 fg
Demir 2000	91,2 c	7,6 a-d	24,5 c-f	9,0 abc	12,4 bcd
Bayraktar	87,5 c	10,0 ab	20,0 ef	5,0 f	11,6 e
Tosunbey	90,5 c	8,2 a-d	35,5 a	8,0 bcd	12,7 abc
Kınacı	124,8 abc	4,5 de	22,5 def	5,5 ef	11,4 ef
Harmankaya	175,5 ab	3,3 e	24,0 c-f	7,5 cde	11,3 ef
Avr.	109,5	6,2	25,0	7,6	11,9
LSD.	79,6	4,0	5,7	2,2	0,7 ¹⁹
CV(%)	37.65	33.18	9.92	12.95	2.57

**2004-2006 SUNN PEST TENT
(DURUM WHEAT)**

Varieties	S.B(2005)	S.B(2006)	D.K(2005)	D.K(2006)	S.B Ave.	D.K Ave.
Altıntaş	33,5 bc	108,5 bc	9,7 a	4,6 c	71,0	7,15
Kunduru	47,5 ab	110,5 bc	9,4 ab	10,6 b	79,0	10,0
Ankara-98	24,5 cd	84,2 c	7,4 bc	11,8 b	54,4	9,6
Ç-1252	51,3 a	77,2 c	9,6 a	8,5 bc	64,3	9,05
Altın 40/98	20,4 cd	104,5 bc	7,9 abc	9,3 bc	62,5	8,6
Kızıltan-91	50,5 ab	172,8 ab	9,3 ab	18,9 a	111,7	14,1
Mirzabey	24,0 cd	104,0 bc	9,3 ab	9,2 bc	64,0	9,3
Selçuklu	15,6 d	190,0 a	6,6 c	13,0 b	102,8	9,8
Ave.	33,5	118,9	8,6	10,8	77,2	9,7
LSD.	14,8	72,6	2,1	5,3		
CV(%)	22,1	30,5	16,9	24,71		

DURUM WHEAT (TENT)

LOW DAMAGED VARIETIES

	Dem	K	Ear	
➤ ALTINTAŞ	(7.1)	ML	❖	KIZILTAN
➤ ALTIN 40/98	(8.6)	ML	❖	KUNDURU-1149
➤ Ç-1252	(9.0)	ML	❖	SELÇUKLU
➤ MİRZABEY	(9.3)	ML	❖	ANKARA-98

HIGH DAMAGED VARIETIES

Dem	K	Ear	
(14.1)			E
(10.0)			E
(9.8)			VE
(9.6)			E

**2005-2006 SUNN PEST (TENT)
(DURUM WHEAT)**

Varieties	Sunn pest nu	Dem Ker(%)	SDS	Wait Sds (30 min)	Protein %
Altıntaş	108,5 bc	4,6 c	20,0 bc	8,0 bc	13,6 a
Kunduru	110,5 bc	10,6 b	22,7 b	7,7 c	14,1 a
Ankara-98	84,2 c	11,8 b	27,7 a	10,0 a	12,9 bc
Ç-1252	77,2 c	8,5 bc	10,0 e	8,7 abc	11,9 d
Altın 40/98	104,5 bc	9,3 bc	22,7 b	7,7 c	13,0 b
Kızıltan-91	172,8 ab	18,9 a	14,0 de	8,7 abc	12,4 cd
Mirzabey	104,0 bc	9,2 bc	13,7 de	7,6 c	11,9 d
Selçuklu	190,0 a	13,0 b	17,7 cd	9,7 ab	12,5 bc
Ave.	118,9	10,8	18,5	8,6	12,8
LSD.	72,6	5,3	4,5	1,94	0,55
CV(%)	30,5	24,71	9,96	9,44	1,80

2004-2006 SUNN PEST (50 Varieties in one tent)

Varieties	YIELD-2005	YIELD-2006	Dem. Ker 2005	Dem.Ker. 2006.	Aver.YIELD	AVE Dem ker.
Sultan 95	450,4 b-ı	446,7 abc	3,16 ghi	1,87 i	448,5	2,51
Kutluk	316,1 i-n	335,0 f-n	2,47 i-l	2,51 ghi	325,5	2,49
Gün-91	404,8 c-ı	411,7 a-h	0,60 q-u	4,61 f-ı	408,2	2,60
Bayraktar	516,5 abc	391,7 b-l	0,30 tu	1,57 i	454,1	0,93
Bezostaya	416,0 b-k	320,0 lmn	0,95 o-u	1,58 i	368,0	1,26
Yakar	422,3 b-j	353,3 f-n	1,35 m-r	5,05 f-ı	387,8	3,20
Demir	496,9 a-d	413,3 a-h	1,05 o-u	2,31 hi	455,1	1,68
Eser	284,2 j-o	400,0 b-j	2,87 g-j	9,07 c-ı	342,1	5,97
Lanser	416,8 b-k	355,0 f-n	0,25 u	5,39 f-ı	385,9	2,82
Kırgız	458,3 a-h	345,0 g-n	0,93 o-u	13,3 b-ı	401,6	7,11
Pehlivan	554,4 ab	438,3 a-d	0,60 q-u	15,09 a-ı	496,3	7,84
Ank-8	280,9 k-o	316,7 mn	0,35 tu	6,51 f-ı	298,8	3,43
Uzunyayla	436,6 b-ı	370,0 d-n	1,79 k-o	25,83 abc	403,3	13,81
Türkmen	556,6 ab	323,3 k-n	0,70 q-u	22,28 a-f	439,2	11,49
Tosunbey	554,0 ab	380,0 b-m	0,91 o-u	20,07 a-g	467,0	10,49
Ank. 093/44	384,8 c-m	319,7 lmn	1,98 j-n	9,63 b-ı	352,2	5,81
Kırkpınar	472,6 a-g	380,0 b-m	1,98 j-n	12,83 b-ı	426,3	7,41
Aksel	366,3 d-n	416,7 a-g	0,55 q-u	20,40 a-f	391,5	10,48
İkizce	362,5 d-n	381,7 b-m	1,33 m-s	20,41 a-f	372,1	10,87
Gerek	328,0 h-n	396,7 b-k	4,53 de	10,32 b-ı	362,3	7,42
Kate A-1	280,5 k-o	450,0 ab	1,67 l-p	10,98 b-ı	365,2	6,32
Kıraç-66	388,2 c-m	356,0 f-n	6,13 b	15,58 a-ı	372,1	10,85
Mızrak	290,7 j-o	340,0 h-n	5,16 bc	19,96 a-h	315,3	12,56
Köse 220/33	264,4 l-o	346,7 f-n	5,16 bc	19,05 a-ı	305,5	12,11

2004-2006 SUNN PEST TRIAL(50 Varieties in one tent)

Varieties	YIELD-2005	YIELD-2006	Dem. Ker 2005	DemKer. 2006.	Aver.YIELD	AVE Dem ker.
Dağdaş	294,8 j-n	420,0 a-f	3,21 f-ı	27,2 ab	357,4	15,21
Atlı	352,3 e-n	406,7 b-h	0,85 p-u	1,87 c-ı	379,5	1,36
Bolal	342,1 f-n	343,3 g-n	0,31 tu	13,0 b-ı	342,7	6,66
Atay-85	353,5 e-n	446,7 abc	2,50 i-l	32,7 a	400,1	17,60
Sivas 111/33	276,9 k-o	356,7 f-n	3,70 efg	17,7 a-ı	316,8	10,70
Yayla 305	152,2 o	340,0 h-n	9,17 a	25,9 abc	246,1	17,53
Haymana-79	266,7 l-o	326,7 j-n	0,31 tu	19,7 a-h	296,7	10,05
Zencirci	390,0 c-m	396,7 b-k	1,04 o-u	4,61 f-ı	393,3	2,82
Prostar	334,5 g-n	304,7 n	1,01 o-u	1,39 ı	319,6	1,20
Hawk	260,4 mno	304,7 n	1,34 m-q	5,32 f-ı	282,5	3,33
Saroz-95	372,6 d-n	299,0 n	4,94 cd	4,82F-ı	335,8	4,88
Yıldız	374,2 d-n	360,0 e-n	3,43 fgh	9,58 b-ı	367,1	6,50
Palandöken	486,3 a-e	363,3 e-n	2,01 j-n	2,36 hı	424,8	2,18
Karasu	280,7 k-o	385,0 b-m	2,18 j-n	7,26 f-ı	332,8	4,72
Kınacı	480,3 a-f	372,7 c-n	0,35 tu	7,97 e-ı	426,5	4,16
Doğu-88	436,6 b-ı	401,7 b-ı	2,13 j-m	2,31 hı	419,1	2,22
Karahan	404,0 c-ı	482,0 a	0,44 stu	8,03 d-ı	443,0	4,23
Konya	446,3 b-ı	433,3 a-e	0,46 r-u	6,06 f-ı	439,8	3,26
Altın 40/98	392 a c-m	388,3 b-m	1,17 n-t	14,5 b-ı	390,1	7,83
Ankara-98	366,3 d-n	379,7 b-m	2,61 h-k	25,0 a-e	373,0	13,81
Kunduru 414/44	398,8 c-m	325,7 j-n	4,84 cd	15,8 a-ı	362,2	10,32
Ç-1252	598,1 a	383,3 b-m	5,89 b	25,6 a-d	490,7	15,74
Kızıltan-91	386,4 c-m	394,0 b-l	5,70 bc	32,7 a	390,2	19,20
Berkmen	376,6 c-n	328,3 i-n	4,50 de	18,8 a-ı	352,4	11,65
Gökgöl	240,5 n-o	302,7 n	6,27 b	26,9 ab	271,6	16,58
Yılmaz	404,3 c-l	331,7 i-n	3,57 fg	19,6 a-h	368,0	11,58
Ave.	382,9	371,6	2,40	13,2	377,2	7,8
Lsd.	141	74,67	0,90	17,7		
Cv%	13,74	9,37	17,54	62,4		

DAMAGED KERNEL % AT 50 VARIETIES IN ONE TENT

LOW DAMAGED VARIETIES

➤ BAYRAKTAR	(0,98)	?
➤ PROSTAR	(1,2)	
➤ BEZOSTAYA	(1,3)	+
➤ ATLI-2002	(1,4)	
➤ DEMİR-2000	(1,7)	+
➤ PALANDÖKEN	(2,2)	
➤ DOĞU-88	(2,2)	
➤ KUTLUK	(2,5)	
➤ SULTAN-95	(2,5)	
➤ GÜN-91	(2,6)	+
➤ LANCER	(2,8)	
➤ ZENCİRCİ	(2,8)	?
➤ ALTIN40/90	(7.8)	+
➤ KUNDURU414	(10.3)	?

HIGH DAMAGED VARIETIES

❖ KIZILTAN-91	(19,2)	+
❖ ATAY 85	(17,6)	
❖ YAYLA-3005	(17,5)	
❖ GÖKGÖL	(16,5)	
❖ Ç-1252	(15,7)	?
❖ DAĞDAŞ	(15,2)	?
❖ ANKARA-98	(13,8)	+
❖ UZUNYAYLA	(13,8)	
❖ MIZRAK	(12,5)	
❖ KÖSE 220/33	(12,1)	
❖ BERKMEN	(11,6)	
❖ YILMAZ	(11,5)	
❖ TÜRKMEN	(11,4)	

THANK YOU