

Yield and quality in relation to salt tolerance: the case of durum wheat



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Classification of 7 Durum wheat variety to soil salinity according to the yield (kg m⁻²)

V1 Om Rabi-5; V2 Hagla; V3 Haurani; V4 Gidara-2; V5 Cham-1;
V6 Jennah Khetifa; V7 Belikh-2

salt **tolerant** (V5 variety Cham-1)
salt **sensitive** (V3 variety Haurani)

the yield quality is ignored

ECiw = 0.9 dS/m

V6	1.2 a
V5	1.1 ab
V7	1.1 ab
V4	1.0 ab
V2	0.9 b
V1	0.9 b
V3	0.9 b

ECiw = 4.0 dS/m

V6	1.0 a
V5	0.9 ab
V7	0.9 ab
V4	0.8 bc
V2	0.7 c
V3	0.7 cd
V1	0.6 d

ECiw = 8.0 dS/m

V5	0.9 a
V7	0.9 a
V6	0.8 a
V4	0.7 a
V2	0.6 b
V1	0.4 c
V3	0.4 c

The final objective is to answer to the following questions:

- 1) Does the highest production observed in the tolerant varieties modify the grain quality?
- 2) Does the environment salinity affect the yield quality?
- 3) In saline environments, are the yield qualitative criteria compatible with quantitative ones?

Materials and methods

- 2 durum wheat varieties
- 3 water qualities:
 - S1 control (EC=0.9 dSm⁻¹)
 - S2 saline treatment (EC=2.3 dSm⁻¹)
 - S3 saline treatment (EC=3.6 dSm⁻¹)

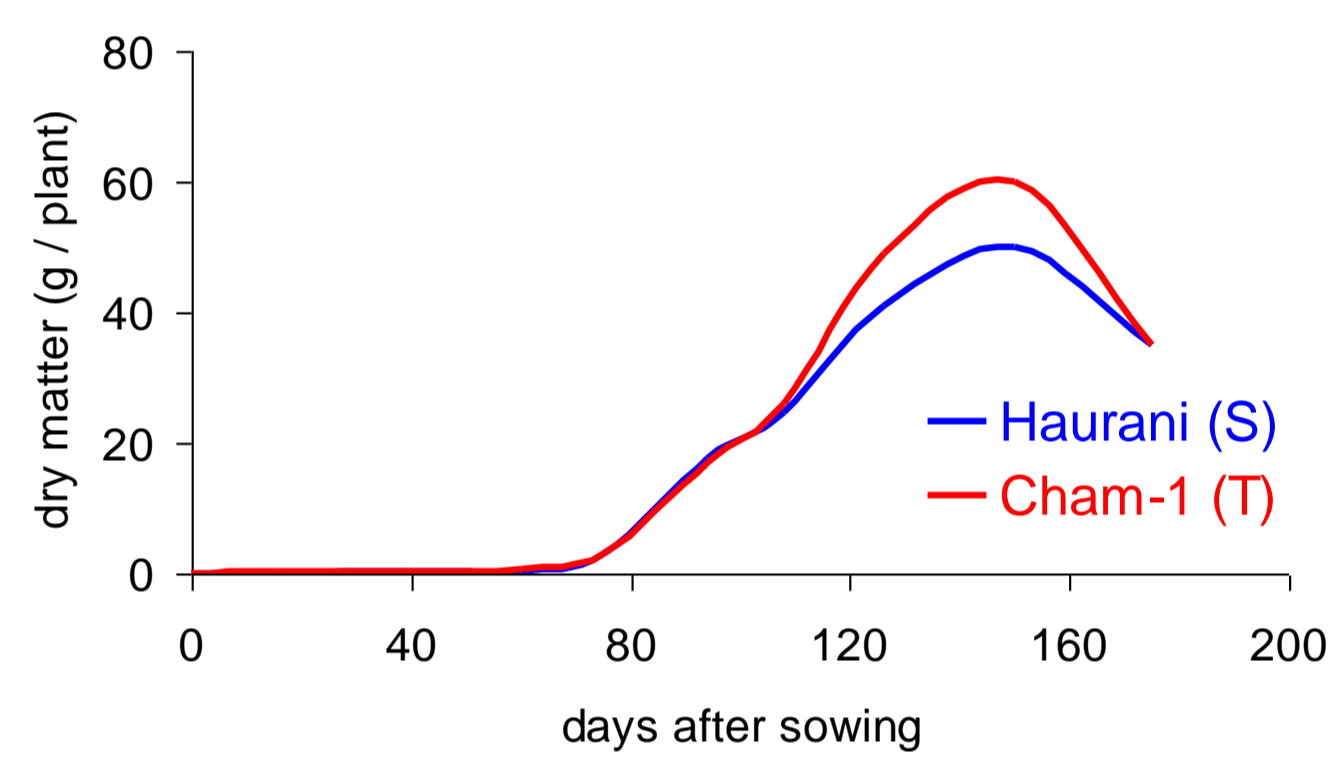


salt sensitive
(variety Haurani)



salt tolerant
(variety Cham-1)

Results and discussion



The total biomass (grain and straw) of **non saline** treatment is the same

	Sensitive variety (Haurani)	Tolerant variety (Cham-1)
Grain yield (kg/m ²)	0.83	0.97

The grain yield of the **salt sensitive** variety Haurani is 15% lower

quality performances under **non saline** conditions

	Sensitive variety (Haurani)	Tolerant variety (Cham-1)	
	2.1	1.7	the ash content (%) reduces
	37.7	41.9	the 1000-kernel weight (g) increases
	4.7	5.4	β-carotene content (ppm) increases
	99	63	gluten index reduces
	excellent	mean	quality of gluten strength

Sensitive variety (Haurani)			Tolerant variety (Cham-1)		
S1	S2	S3	S1	S2	S3
0.83	0.69	0.66	0.97	0.96	0.87
2.1	2.4	2.0	1.7	1.6	1.5
4.7	5.0	4.7	5.4	5.3	5.0
81	77	88	48	52	63
10	11	10	11	11	11
99	99	99	63	44	54

Grain yield (kg /m ²)
ash content (%)
β-carotene (ppm)
sedimentation test (mm)
gluten (%)
gluten index

Yield and quality performances under **non saline** (S1) & **saline** (S2, S3) conditions

Conclusions

The grain quality changes when improving the yield quantity

- some changes are positively accepted
 - grain weight
 - colour

other ones should be retained as negative

- SDS
 - gluten index
- (the higher yield of Cham-1 is in opposition with the yield quality)

Salinity reduces yield quantity

- but it appears always beneficial in terms of yield quality