

Fall and spring sowing of durum in Central Europe

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Introduction

Around the Mediterranean durum is sown in fall to take advantage of winter moisture. In regions with a colder winter, durum has to be sown in spring due to its lack of winter hardiness.



Fig. 1. The risk of fall sowing – insufficient winter hardiness (spring 2006)

Spring droughts are frequent in Central Europe and therefore the yield variation of spring sown durum can amount up to 100% from year to year (Fig.2). Fall sown durums are more stable but require winter hardiness.

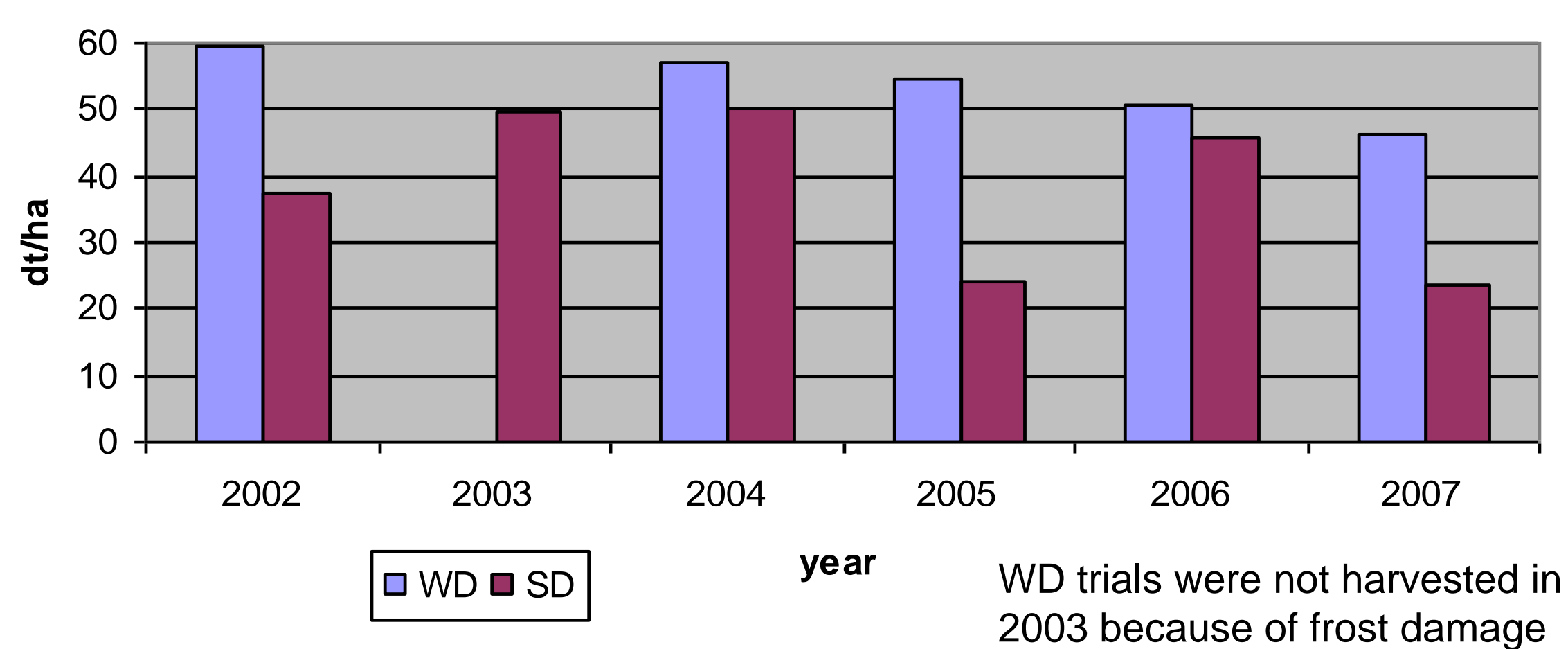


Fig. 2. Mean yield of spring (SD) and fall (WD) sown durum trials at a rainfed location in Austria

Durum with (WD) versus without (SD) winter hardiness, fall sown:

Advanced lines of SD and WD were sown together in fall 06. A mild winter resulted in 100% survival of SD and no winter damage at all.

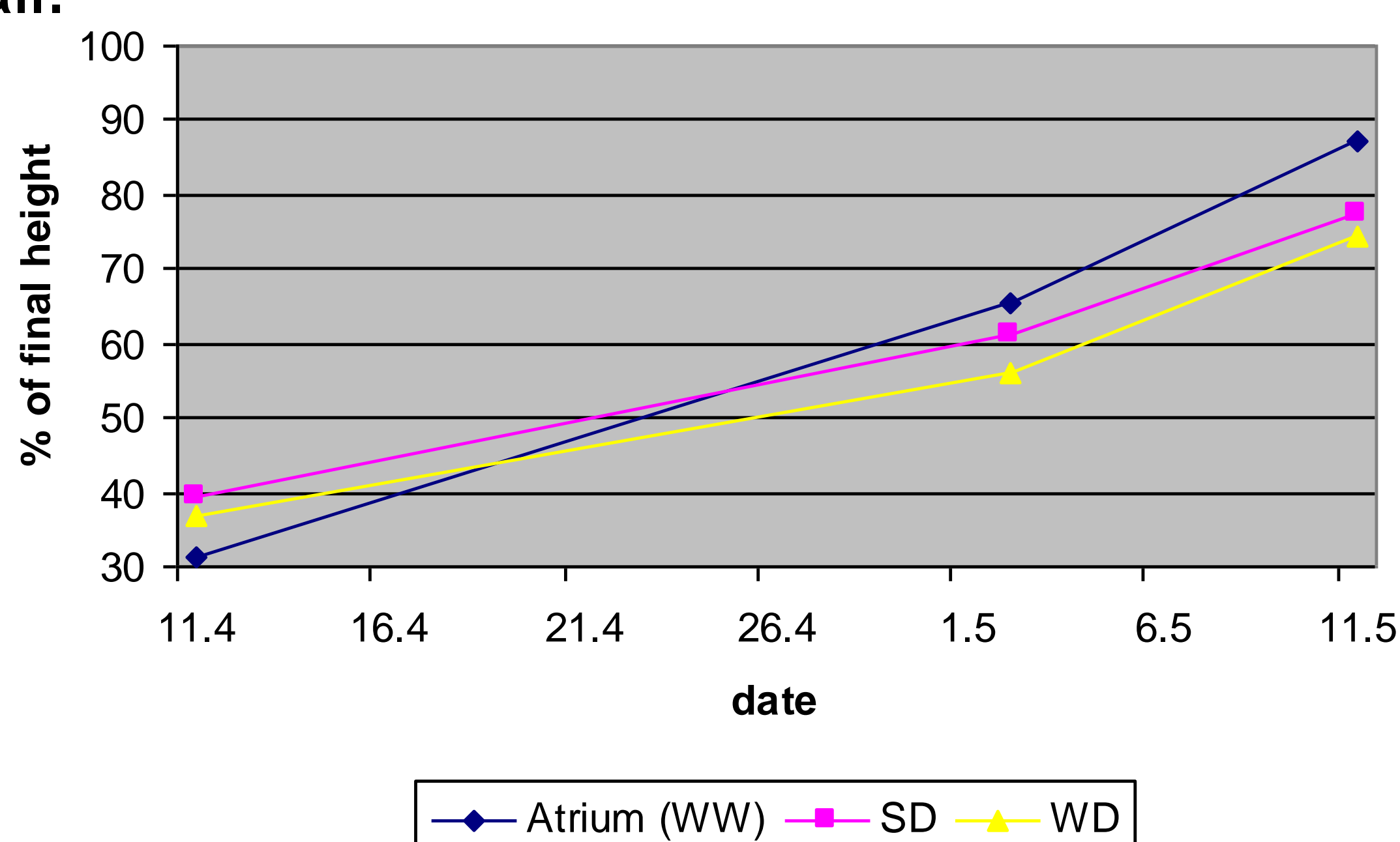


Fig. 3. Height was measured at three dates in the fall sown trials of SD and WD with one winter wheat (WW) check

Compared to WD the SD showed faster growth, earlier heading, diseases came later and less severe and the average yield was higher (77 versus 63 dt/ha)

Fall sowing versus spring sowing

An orthogonal set of spring durums (SD) was sown at two locations in spring 2006 (harvest summer 06) and in fall 2006 (harvest summer 07).

Tab.1. Correlation between the same genotypes sown in fall and in spring at two locations each

heading	spring sown		fall sown	
n=80	P06	W06	P07	A07
P06	1	0,91**	0,53**	0,49**
W06	0,91**	1	0,49**	0,42**
P07	0,53**	0,49**	1	0,94**
A07	0,49**	0,42**	0,94**	1

Some genotypes were very early when spring sown but only average when fall sown. This can be attributed to different combinations of photoperiodic response and earliness per se.

Tab.2. Correlation between yield at the different environments

yield	spring sown		fall sown		mean
n=80	P06	W06	P07	A07	dt/ha
P06	1	0,35**	0,29**	-0,03	54
W06	0,35**	1	0,18	-0,18	47
P07	0,29**	0,18	1	0,34**	74
A07	-0,03	-0,18	0,34**	1	79

The negative correlation hints at the very different conditions at the most intensive (A07) and the most extensive location (W06).

Discussion:

Fall sown durum makes better use of winter moisture but requires winter hardiness in a continental climate. Winter hardiness comes at the cost of more reluctant growth in fall and spring which is even more pronounced in winter wheat (Fig.3). Better health and also higher yield of SD can be attributed to more intense breeding efforts. Apart from winter hardiness spring and fall sowing requires different types.



Fig. 4. In 2007 fall and spring sown durum trials grew on the same field
Back = fall sown durum (36-93 dt/ha)
Front = spring sown, twice irrigated, (24-58 dt/ha)

A growing interest in durum in central Europe and more frequent spring droughts, such as in 2007 (Fig.4) will increase the importance of WD for that region.