

Chickpea Variety Trial Yield and Composition, 2006

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Abstract

Chickpeas are a potential rotation crop in central Oregon that use minimal water and reduce the nitrogen fertilizer required for a following crop. This study was conducted to determine which cultivars would be suited to the local environment. Variety trials of 14 cultivars and advanced breeding lines were conducted at two locations in central Oregon. The fungal disease *Ascochyta* was a problem at one location, where the trial was almost abandoned. At the other location, yields were respectable and seed size large, indicating that with *Ascochyta* control, central Oregon holds promise as a source of large seed chickpeas. Further research will concentrate not only on variety trials but also on management strategies for containing *Ascochyta*.

Introduction

With their adaptation to dry, cool growing conditions and high value when produced at premium quality, chickpeas (*Cicer arietinum*) are a potential rotation crop for central Oregon. Chickpeas have been grown in central Oregon under contract for approximately \$0.24/lb, although larger chickpeas are marketed around the world in excess of \$0.45/lb. With yields typically between 1,500 and 2,000lb/acre, as well as the ability to contribute to soil nitrogen, they present themselves as a viable alternative to rotational crops like wheat and barley. Given the low level of resistance in kabuli chickpea, *Ascochyta* blight presents a considerable challenge to growing the crop in central Oregon.

Methods and Materials

Two variety trials were conducted within commercial fields of chickpeas at the Dean Davis property near Prineville (44.37°N, 120.90°W, 2,960 ft elevation) and at Rex Barber's property at Lower Bridge (44.35°N, 121.33°W, 2,720 ft elevation). Both trials were organized as randomized complete blocks with three reps. Plots measured 20 ft long by 4 ft wide. There were 6 rows per plot and the first and sixth rows and 2 ft at the ends of each plot were removed prior to harvest. At Prineville one desi ('Myles') and three kabuli ('Dwelley', 'Dylan', and 'Sierra') cultivars were included along with six kabuli breeding lines from Washington State University's chickpea breeding program, as well as two commercially grown kabuli cultivars provided by the Kelly Bean Company (KBC) ('HB14' and 'HB19'). In addition to these lines, two extra-large-seeded cultivars ('Macarena' and 'Kimberley Large') were included at the trial conducted at Lower Bridge. Seed was treated with Ridomil® (Syngenta), Mertect® (Syngenta), and Maxim® (Syngenta) at recommended rates and sown at 4.9 seeds/ft² (approximately 240kg/ha or 215lb/acre) at a depth of 1.5 inches. Both trials were sown using a single row planter and an average of only 2.4 plants/ft² was achieved at both locations. Trials at both locations were pivot irrigated. The Prineville trial was sown on April 14, 2006 and irrigated within 2 days. All plots showed considerable *Ascochyta* disease from flowering (mid-June)

onwards. In response, one fungicidal spray of Quadris® (Syngenta)(15oz/acre) was applied. The trial was harvested on 19 September, 2006 using a sickle-bar mower and the biomass was brought back to Central Oregon Agricultural Research Center, Madras, where it was threshed using a stationary threshing machine. The trial at Lower Bridge was sown on 27 April, 2006 and irrigated 2 days later. Ten lb/acre of 4-10-8-3 fertilizer solution was dissolved and applied in the initial irrigation while 300 lb/acre of 16-16-16-7 fertilizer was broadcast on May 1, prior to emergence. Low levels of Ascochyta were observed in some random plots at late flowering, except ‘Kimberley Large’, which was severely affected for the majority of the season. Plots were harvested on 25 September, 2006 in the same manner as the Prineville trial.

Results and Discussion

The severity of the Ascochyta blight at Prineville was so bad that the trial was nearly abandoned. Yield was commercially unacceptable and seed weight was also low (Table 1). While yields were much higher at Lower Bridge, the seed weight was lower than anticipated for ‘Macarena’ and ‘Kimberley Large’. The seed sown of these two cultivars averaged 57 and 60 g/1,000 seeds, respectively, compared to the other kabuli types that averaged around 45 g/1,000 seed.

Table 1. Yield (lb/acre) and 1,000 seed weight (g) of chickpeas grown at Dean Davis’ and Rex Barber’s farms in 2006.

Cultivar	Dean Davis Farm		Rex Barber Farm	
	Yield (lb/ac)	1,000 seed wt (g)	Yield (lb/ac)	1,000 seed wt (g)
Dwelley	295	40.6	1376	52.6
Dylan	375	41.0	1030	56.4
Sierra	925	45.7	1343	54.1
CA9783163C	201	41.1	823	56.7
CA9990B1579C	906	47.1	1305	55.0
CA0090B347C	1431	43.8	452	45.7
CA0190B839C	397	42.3	1040	53.7
CA9890233W	74	39.7	890	54.4
CA9990I875W	188	41.0	861	51.0
Myles	1139	19.3	1216	18.5
HB14	516	44.9	1809	44.9
HB19	1074	42.7	1563	52.6
Macarena	*	*	781	51.4
Kimberley Large	*	*	329	50.0
LSD (0.05)	620	5.5	900	12.2

The two cultivars from KBC were the highest yielding when Ascochyta was contained or minimal, but a gross return of less than \$500/acre does not make the crop an attractive proposition. Seed size in general was larger than the seed sown, indicating that central Oregon may be a good location for producing large chickpeas. Surprisingly, ‘Macarena’ and ‘Kimberley Large’ produced relatively small chickpeas and this may be in response

to the Ascochyta. Research from Canada suggests that multiple fungicidal sprays are required to prevent or reduce the severity of Ascochyta and future research of chickpeas in central Oregon will focus on the management of this disease, possibly by applying fungicides through irrigation water.

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