

## DOUBLE LOW WINTER AND SPRING RAPESEED PRODUCTION SYSTEMS IN THE PACIFIC NORTHWESTERN UNITED STATES: TRIALS, CHALLENGES, AND PROGRESS

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## ABSTRACT

Double low (00) rapeseed production in the Pacific Northwestern (PNW) United States is discussed. Emphasis will be placed on the evolution of the industry since its inception in 1986. In a relatively small geographical area, the precipitation ranges from 125-900 mm annually, the frost free days from 125-220, and the winter low temperature of -25 to summer high of 40 degrees C. Both winter and spring types are produced. Yields range between 750-2000 kg/ha (1500-2500 kg/ha irrigated) for spring and 1500-3000 kg/ha (3000-4500 kg/ha irrigated) for winter. Each regional environment dictates unique production practices which are novel to rapeseed cultivation in more traditional areas of the world.

## INTRODUCTION

Rapeseed was introduced to the PNW during the 1930's. The winter form was then used for fodder. By 1960 winter rapeseed was produced for bird seed and industrial oil use (2000 to 5000 mt/yr). Spring types were introduced in the early 1980's by state universities and were 00 B. napus varieties developed in Western Canada. 00 winter and spring types were not grown commercially until 1986. Winter types were predominately grown until the early 1990's, then adapted spring cultivars became available such that today, 80% of the area is now of the spring form.

Early attempts to raise 00 rapeseed were met with considerable difficulties. Besides marketing/logistical obstacles, basic production techniques were poorly understood, and newly introduced varieties were inferior. Initially there was a dramatic expansion of the crop, followed by a sharp reduction because of the above mentioned problems (Table 1). By the early 1990's with better adapted cultivars, experience, and profitable prices, production again increased.

TABLE 1. Ten years of PNW 00 rapeseed production in hectares.

1986	1987	1988	1989	1990	1991	1992	1993	1994	1995est
500	10000	3300	3000	4300	8800	22500	45000	60000	75000

## EXPERIMENTAL

Environmental Conditions

00 rapeseed is primarily grown in four production zones (Table 2). In all four areas nearly 70% of all the precipitation falls from October to April. Precipitation is insignificant during the summer months. Temperatures in all production zones can range from -25 to 40 degrees C. Generally, cooler temperatures are found in the higher elevations and warmer temperatures in the lower elevations.

TABLE 2. Major environmental/agronomic interactions.

Description	Columbia Basin	Columbia Plateau	Palouse Prairies	S.E. Idaho
Deg. latitude	46-49 N	46-48 N	45-48 N	40-43 N
Elevation in m	150-450	350-650	600-1100	800-1500
Frost free	220 days	160 days	140 days	125 days
Precip in mm	100-200	200-400	400-750	250-450
Winter	mild	severe	moderate	mod/sev
Snow cover	seldom	variable	often	often
Soil texture	sandy/loam	silt/loam	clay/loam	sandy/loam
Crop system	annual	crop/fallow	annual	annual
Water use	irrigated	dryland	dryland	irrigated
Dominant crops	fruits vegetables	w wheat s barley	w wheat lentils	potatoes grains

00 Winter Rapeseed Production Practices

00 winter rapeseed production in the PNW is limited by: adequate seedbed moisture (except under irrigation), winter hardiness of cultivars, the cabbage seedpod weevil--Ceutorhynchus assimilis, limited herbicide availability, and harvest losses--shatter with B. napus varieties only. Specific practices are listed in Table 3.

00 Spring Rapeseed Production Practices

Spring types are grown economically throughout the PNW with the exception of the Columbia Basin. The limiting factors in producing the crop are primarily excessive heat during bloom and seed filling, limited control measures for flea beetles--Phyllotreta spp., restricted, herbicide availability, and harvest losses--shatter on B. napus varieties only. Low linolenic and high oleic B. napus varieties are produced on approximately 50% of the seeded area and yield 20-25% lower than conventional varieties. Specific practices are listed in Table 4.

TABLE 3. Major 00 winter rapeseed production practices.

Description	Columbia Basin	Columbia Plateau	Palouse Prairies	S.E. Idaho
Previous crop	variable	fallow	fallow	variable
<u>B. napus</u>	often	variable	variable	often
<u>B. rapa</u>	seldom	often	variable	seldom
Seed date	Sep10-Oct10	Aug25-Sep25	Aug1-31	Sep1-30
Depth in cm	2.0-3.2	6.4-8.9	4.5-5.7	2.0-3.2
Rate in kg/ha	4-6	3-5	6-8	4-6
Rows in cm	15.3-17.8	25.5-45.7	15.3-25.5	15.3-17.8
Seeding equip	disc & hoe	deep furrow	disc & hoe	disc & hoe
N fert in kg/ha	200-250	75-125	150-200	175-225
S fert in kg/ha	50-63	19-32	38-50	44-57
Winter injury	seldom	variable	seldom	seldom
Water injury	seldom	seldom	often	seldom
Bloom dates	Apr10-May10	Apr15-May15	Apr20-May31	May1-Jun5
Swathing	variable	seldom	seldom	seldom
Spodnam treat	variable	variable	seldom	variable
Harvest dates	Jun10-Jul5	Jun25-Jul15	Jul20-Aug10	Aug1-20
Yield in kg/ha	3500-4500	1500-2500	2000-3000	3000-4000

TABLE 4. Major 00 spring rapeseed production practices.

Description	Columbia Plateau	Palouse Prairies	S.E. Idaho
Previous crop	fallow/wheat	wheat/barley	variable
<u>B. napus</u>	seldom	variable	variable
<u>B. rapa</u>	often	variable	variable
Seed date	Mar1-Apr15	Apr10-May10	Apr15-May15
Depth in cm	2.0-3.2	2.0-3.2	2.0-3.2
Rate in kg/ha	4-6	6-8	4-6
Rows in cm	15.3-17.8	same	same
Seeding equip	disc/hoe/broadcast	same	same
N fert in kg/ha	50-100	75-125	125-175
S fert in kg/ha	13-25	19-31	31-44
Bloom dates	May1-31	May20-Jul10	Jun5-Jul15
Swathing	seldom	variable	variable
Harvest dates	Jul20-Aug20	Aug1-31	Aug10-Sep10
Yield in kg/ha	750-1500	1000-2000	1500-2500