

**Agronomic and Economic Feasibility of Yellow Mustard (*Sinapis  
alba* L.) as an Alternative Crop in the Dryland Region of the  
Pacific Northwest**

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**Abstract**

Traditional crop rotations in the Pacific Northwest (PNW) have included small grain cereals, primarily winter and spring wheat (*Triticum aestivum* L.) and barley (*Hordeum vulgare* L.), and non-cereal grains such as pea (*Pisum sativum* L.) and lentil (*Lens culinaris* M.). Canola (*Brassica napus* L.) also has been grown recently in this region. Limited choice of adapted crops in this region has made it difficult for farmers to reduce soil erosion, and to break disease, weed, and insect cycles that result from intensive cereal monoculture, and hence increases their reliance on agricultural chemicals. Yellow mustard has shown very good adaptability to growing conditions in this region and requires fewer insecticides than many traditional spring crops. At present, very little research has been conducted looking at cultural practices to best establish this crop. In this study, both the agronomic and economic feasibility of yellow mustard as an alternative crop to small grain cereal production were examined through greenhouse and small-plot field studies conducted in 1995 to 1997 and a phone survey in 1997. The results of this study showed that averaged over two years and three locations, the application of herbicides did significantly decrease the total amount of weed biomass in yellow mustard or did not increase seed yield of yellow mustard and spring canola. Seeding yellow mustard at 9.0 and 13.5 kg ha<sup>-1</sup> produced significantly greater yields than when seeded at 4.5 kg ha<sup>-1</sup> under both early and delayed seeding. Delayed planting by 2 weeks decreased mustard yield by 15%. Yellow mustard seed yield was not increased when sulfur was applied even when the soil had less than 6 ppm of sulfur in the top 61 cm. In areas of the PNW that receive greater than 400 mm of annual precipitation, nitrogen application of yellow mustard should not exceed more than 112 kg ha<sup>-1</sup> applied nitrogen and total available nitrogen should not exceed 248 kg ha<sup>-1</sup>. Increased nitrogen delayed flowering and produced taller plants that were more susceptible to lodging. At prevailing prices, net

returns above variable input cost in the higher (>400 mm) rainfall region of the PNW for yellow mustard, canola, pea, and lentil were estimated at \$232.58, \$178.87, \$220.56, and \$279.62. In the lower (<400 mm) rainfall region of the PNW, net returns above variable input cost for yellow mustard and canola were estimated at \$174.35 and \$-59.01 respectively. The market for condiment yellow mustard, unlike pea, lentil, canola, and small grain cereals, is limited despite the rapid increase in yellow mustard seed production in the United States since 1995. Two potential ways to increase the market of yellow mustard is to compete with Canada for export markets and through altering the end use product of yellow mustard. In conclusion, the incorporation of yellow mustard into a small grain cereal monoculture should diversify risk, as the farmer is not relying solely on small grain cereal prices and other non-cereal grain prices. Yellow mustard may offer farmers in the dryland region of the PNW greater flexibility in their cropping rotation as planting date may not be as critical as with other spring planted crops, and delayed planting has the potential to increase yellow mustards ability to compete with weeds. Overall, yellow mustard is both agronomically and economically feasible as an alternative crop to small grain cereal production in the dryland region of the PNW, and has the potential to reduce soil erosion, reduce grower's reliance on agricultural chemicals, and provide economic diversity.