Popping and Yield Characteristics of Nuña Bean Lines Developed for Temperate Climates

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ABSTRACT

Nuña bean is a special market class of common bean (Phaseolus vulgaris L.) indigenous to the Andean mountains of Ecuador, Peru, and Bolivia. Nuña bean is often referred to as “popping” or “pop” beans because the seed expands rapidly when heated in oil. South American nuña beans are not adapted to production in the United States because they are photoperiod sensitive and have an aggressive climbing, indeterminate growth habit. The popping characteristic from nuña bean was successfully introgressed into 10 dry bean lines with determinate growth habit and adaptation to the temperate climates of North America. The objective of this research was to evaluate the nuña breeding lines for yield, popping ability, and seed size at three locations in Colorado. Two lines, CO49956 and CO49957, had the highest popping frequency (70 and 68%, respectively) among the lines tested. Mean seed yield among lines varied from 1321 to 1794 kg ha\(^{-1}\) and mean seed size varied from 34 to 44 g 100 seeds\(^{-1}\). All lines had determinate growth habit with Type I architecture. Our findings indicate that four of the lines, CO49956, CO49957, CO50004, and CO49991, were the most productive and had the highest popping frequency. Nuña popping beans have potential for commercial on-farm production in suitable temperate locations and as a commercial product to the American consumer.

Nuña beans have unique potential as a snack food in the United States because they have a nut-like taste and malted-milk ball texture. They also have beneficial nutritional aspects of higher starch, amylase, and Cu than other dry bean market classes. Conversely, nuña beans have slightly lower digestibility than boiled dry beans (Spaeth et al., 1989; National Research Council, 1989). Even though nuña bean has potential as a new market class of dry beans in the temperate regions of the United States, cultivars developed in South America are not suitable for production because they are photoperiod sensitive and only flower during short daylength, and have a climbing growth habit not suitable for mechanical harvest (Zimmerer, 1992).

Nuña beans are classified as race Peru of the Andean Center of Domestication (COD) (Singh et al., 1991) of common bean. The Andean COD is one of two CODs that also includes the Middle American COD. Market classes of dry bean produced in the United States originate from both CODs, including pinto, great northern, and navy beans classified into the Middle American COD, and are characterized by small- to medium-sized seed, indeterminate semi-vine or upright growth habit. Light and dark red kidney, and cranberry market classes grown in the United States are classified into the Andean COD and are characterized by having large seed size, determinate growth habit, and early maturity. The nuña beans from race Peru of the Andean gene pool is characterized as having medium to large seed, indeterminate strong climbing growth habit, very late maturity, and short-daylength photoperiod sensitivity.

Tohme et al. (1995) recognized that nuña beans from the Andean region of South America were unsuitable for commercial production in temperate zones because they were photoperiod sensitive. To develop nuña beans for commercial production in the temperate zones, they suggested that popping ability be combined with bush (determinate) growth habit.

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Abbreviations: COD, Center of Domestication.