

Request to Approve PS510737 for Cultivar Release

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I. General Situation

Smooth green peas are produced on 145,000 acres in the Pacific Northwest and over 200,000 acres nationwide. Recent years have seen a rapid increase in the number of planted acres particularly in the upper Midwest states of North Dakota and Montana. Smooth green peas are marketed as whole or split peas and are grown primarily for human food consumption. The majority of the split peas are sold domestically while the whole peas are exported.

II. Description of Market Class

Green cotyledon dry peas are characterized by seed that is round, smooth and the weight of 100 seed ranges from 17.0 to 22.0 grams. It is desirable for these peas to have dark green cotyledons which resist bleaching, thereby maintaining a durable green color. This class of pea can be used whole or split and is primarily used in soup mixes and for reconstitution and canning.

III. Need for cultivar

Columbian is the current industry standard and has been in production since the early 1980s. Its primary benefits are good seed size and excellent resistance to bleaching. Bleaching in peas is the result of fading or complete loss of pigment in the cotyledons of dry seed. It is most often associated with moisture from rain or heavy dews on dry seed combined with intense sunlight. Maintenance of dark green color is a major quality criterion in the industry. Columbian is resistant to fusarium wilt race 1, but is susceptible to powdery mildew a foliar disease which can cause significant losses in yield and seed quality. In addition, Columbian has a long vine plant type with normal leaf morphology. It tends to lodge in the field creating conditions conducive to disease development and difficulty in harvesting the crop. Numerous European cultivars with excellent standing ability have been introduced into U.S. production regions, but have been met with substantial resistance due to their excessive susceptibility to bleach.

IV. Description

PS510737 is a smooth green pea that has a semi-dwarf growth habit and normal leaf morphology. PS510737 has a high yield potential for the Pacific Northwest and Midwest states (Tables 1 and 2). During the years 1997, 1998 and 1999 PS510737 produced an average of 4% greater seed yield than Columbian. However, in 1998 PS510737 produced 36% greater seed yield than Columbian. It also possesses resistance to fusarium wilt race 1, pea enation mosaic virus and powdery mildew.

Seed quality of PS510737 is good. It has exceptionally dark green color and is resistant to seed bleach. It has relatively low hard seed content, however, due to the dry conditions and variable field environment in 1999, the hard seed number was higher than expected.

V. Intention

PS510737 is intended to be an interim replacement for Columbian based on greater yield potential and its resistance to bleach, powdery mildew and pea enation mosaic virus. The interim nature of this replacement is due to the demand and development of cultivars with upright growth habit which will make direct harvest possible. There will be an approximate delay of 5 years before a cultivar with upright growth and acceptable seed quality is released and available for production.

Current production of green cotyledon dry peas indicates that the production potential of PS510737 could reach 100,000 acres in a relatively short timeframe.

VI. Identification

A. Selection Number: PS510737 (Cross number : X93P046)

B. Proposed Name: *To be decided*

C. Pedigree: RNK-2100/PS010838

VII. General Agronomics

Agronomic Evaluations

PS510737 has been evaluated in the USDA-ARS Preliminary (1996) and Advanced Yield Trials (1997 - 1999) and in the Regional Yield Trial in 1998 and 1999 (Table). The preliminary yield trials were grown at one location, Spillman Research Farm and the advanced yield trials were grown at three locations, Genesee, ID; Pullman, Oakesdale or Fairfield, WA. The regional yield trial was grown at four locations in 1999, Walla Walla, WA; Kalispell, MT; Carrington, ND and Minot, ND.

Thirteen site-years of yield and agronomic data have been collected on PS510737 (Tables 3 through 9). Nine out of these 13 years this line has produced greater seed yield than at least one of the checks. In all four experiments where this line did not produce well, it produced at or above the trial mean. The Oakesdale, WA and Genesee, ID sites in 1997 were both low yielding trials and accounted for two of the low yielding environments for PS510737. This indicates that PS510737 is responsive to favorable growing conditions, but is not stable across environments. However, in favorable conditions it produces well.

Other Agronomic Traits

Flowering Date: PS510737 flowers at the 16th node and flowers an average 61 days after sowing.

Maturity: PS510737 matures in approximately 104 days after sowing.

Plant Height: PS510737 has short plant stature and an average vine length of 51 cm.

Seed Size: The 100-seed weight averages 20.8 gms.

End-use Quality

PS510737 has been tested in quality evaluations in the Grain Legume Genetics and Physiology quality laboratory for two years and has proven to have excellent seed quality characteristics (Tables 10 and 11). After 20 hours of soaking, the seed maintained its color and cooked in 20 minutes. Percent water uptake averaged 105.3 while conductivity of the soak water averaged 18.3 microsiemens per gram of seed. Hard seed

number was 0.3 in 1998, but increased to 17.3 in 1999 due to extreme heat during seed maturation. Overall, the seed quality of PS510737 is excellent and would be an acceptable replacement for Columbian and the other cultivars currently in production.

Disease Resistance

PS510737 is resistant to fusarium wilt race 1, pea enation mosaic virus and powdery mildew all of which can be important diseases in the pea production regions of the U.S.

Weaknesses

The primary weakness of PS510737 is its short plant stature and tendency to lodge under field conditions making it difficult to harvest without lifters or a pea bar. In addition, seed yield from PS510737 has been somewhat variable from year to year suggesting that it is not widely adapted to differing environmental conditions.

VIII. Seed source, Status and Availability: One hundred single plants were produced in the greenhouse in Fall 1998 by USDA-ARS personnel, single plant rows were produced in 1999 and pre-breeder's seed was produced at Brawley, CA during the winter of 1999-2000.

IX. Probable date for release: Breeder's seed will be produced in 2000 and Foundation seed will be produced in 2001 or as winter increase in the fall of 2000.

X. Provisions for PVP

Plant Variety Protection will not be sought for PS510737.