

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

Applicant: ConAgra, Inc.

Crop: Chickpea (*Cicer arietinum*)

Temporary Designation: HB-19

Variety Name: Stan

16. Exhibit A. Origin and Breeding History of the Variety

(1) The genealogy and the breeding method

The entry from which HB-19 was developed was one of many breeding lines received in California in fall of 1992, from ICARDA in Syria*.

It was planted by Helm Bean & Seed (now KBC Trading & Processing Co.) On 26 December 1992 at the ranch of Jack Kochergen in the San Joaquin Valley as part of an experimental germplasm trial. It was entry #19 in the trial labeled CIYT-LA-93. It was variable for several characters and was subsequently reselected for several generations.

The parentage is given as follows

The cross was made in 1988 as #166 in Tel Hadya, Lebanon, between ILC1919 and FLIP 85-4c. ILC1919 is from Punjab India, received by ICARDA as L550. This line was the most adapted line in international ICARDA trials in early years but it had relatively small seed size. The other parent (FLIP 85-4c) is a line derived from the cross LIC2593 x ILC3279 and is cold and Ascochyta blight-tolerant, with large seed size.

The entry HB-19 was received by us as entry 19 in the CIYT-LA-93 trial and its designated name was FLIP 90-15c. It was identified by us in 1993 as a promising line with variable plant and seed size and was reselected.

(2) Details of subsequent selection and multiplication

Seed harvested in 1993 was screened for size with selection of sizes retained above a #24 hole screen. Similar selection, based on seed size, was carried out in 1994-96. In 1995, with the arrival of Ascochyta blight, selection was carried out in the field for plants with least disease and largest, most vigorous canopy. By 1997, 1,409 hundredweight of seed

*ICARDA is the International Center for Agricultural Research in the Dry Areas, based at Aleppo, Syria. It is one of the 16 centers supported by the Consultative Group on International Agricultural Research (CGIAR). It has regional responsibility for west Asia and North Africa for the improvement of several crops, including chickpeas. It distributes breeding lines freely to interested collaborators without restriction or ownership claims.

was harvested as breeder seed from this reselected entry. After further seed-size screening, the entry was found to be uniform in 1998 for plant morphology and resistance to *Ascochyta* blight in plots in the San Joaquin Valley.

(3) *Evidence of uniformity and stability*

Repeated observations in seed increase plots in 1997 and 1998 showed no evidence of segregation for any plant character or in resistance levels to *Ascochyta*. This resistance was tested separately for two years in inoculated plots at Kerman, CA and at Pullman, WA, and all plants performed as morphologically uniform and uniformly highly resistant (but not immune). Seed has been tested since 1994 for can-ability by S&W Company and each year it has been given the same ranking of quality and given the "Private Label" rating.

(4) *Type and frequency of variants and off-types*

The perfected and selected HB-19 variety appeared completely uniform in seed increase plots and in yield and disease screening trials in 1997 and 1998. Careful observations throughout the growing season show no indication of remaining variability for plant type, vigor, color or seed-setting ability.

Chickpeas are strictly self-pollinated and, in addition, the seed fields were separated according to California Crop Improvement Association rules, from fields of other chickpea varieties.

16. Exhibit B. Statement of Distinctness

HB-19 differs from and can be readily distinguished from all the varieties currently grown in the USA. Plants of HB-19 are semi-upright and larger (up to 80 cm) than any variety being grown in the USA and Canada. The other large variety grown in California is HB-14, which has a characteristic V-shape, which clearly differs from HB-19's morphology of a more random-spreading branching pattern. Seed of HB-19 is also larger than seed of HB-14

Leaves of HB-19 are compound pinnate, different from the "simple" leaves of the three varieties released and grown in the Pacific Northwest (Sanford, Dwelley, and Evans). Likewise, large-plant varieties grown in Mexico have the "simple" leaf morphology, clearly distinguishable from the compound pinnate character of HB-19.

HB-19 clearly differs from other California varieties as follows:

From HB-14 in not being V-shaped and having larger seeds.

From UC-27 in larger plant size, more upright, early growth, and larger seed size.

From UC-15 in larger plant size and susceptibility to *Fusarium* wilt (UC15 is resistant).

In relation to varieties grown elsewhere in the world, one should consider India, Australia, Canada, and the Mediterranean region.

I visited India in April 1997 and examined chickpeas and chickpea research at the major chickpea research locations. Most chickpeas are of the 'Desi' type which are small-seeded and dark colored. The few large-seeded 'Kabuli' types grown (HB-19 is a 'Kabuli') are not as large in plant size as HB-19, nor do they have seed size as large as HB-19.

The released varieties in Australia and Canada are all of smaller plant size and seed size.

In the Mediterranean region most acreage consists of variable landraces, grown by villagers for centuries. It is from such landraces that the large germplasm collection at ICARDA (Syria) has been assembled and from which their breeding program has been established. I have visited their field collections twice and have observed their breeding plots and varietal demonstration plots as well. Great variability is present. Various types are in the breeding stage, but all have smaller seed than HB-19. The large seeded types released as new varieties in Morocco, Turkey, and Spain are not of the semi-erect plant morphology of HB-19. The three most recently released varieties in Spain (Kairo, Athena and Bagda) have been grown in our plots in California and, although large-seeded, they have a spreading growth habit and are also susceptible to *Ascochyta*.

In summary, we believe there is no released variety anywhere that can be confused with HB-19.

16. Exhibit C. Description of Variety

It should be recognized that chickpeas are indeterminate plants and their morphology is very plastic, depending on environmental conditions, especially soil moisture. Even their growth duration is very plastic. Thus, measurement of most characters varies depending on season and field conditions. For a thorough treatment, the reader should refer to the chapter "Morphology of Chickpea" by J.I. Cubero in *The Chickpea* (1987) Ed. M.C. Saxena and K.B. Singh, CAB International, Oxon, UK.

Also, we have been informed that no form for description exists at PVPO or elsewhere.

Nevertheless, we are providing some representative data, averaged over many plants grown in the 1997-98 season (December-June) in the San Joaquin Valley of California.

The seed of HB-19 most closely approximates the code 2.5Y 8/4 in Munsell Book of Color Standards (Pocket Edition, Vol. 2, 1942). Also, in the Standard Color Reference of America, the color equates with code 800003, and name "Ivory" (Tenth Edition, 1981, the color association of the U.S., 24 East 38th Street, N.Y., N.Y. 10016). This color approximates that of variety HB-19.

16. Exhibit C

Description of Variety HB-19

Height	65-80 cm
Primary branches emerging close to ground level	4.8 primary branches/plant
Pod-bearing branches per plant	17.2
Height of emergence of secondary branches	8.3 cm
Height of lowest pod	10.2 cm
Height of highest pod	63 cm
Pods/plant	82
Pod size and shape	32x16x14 mm with sharp point (micro) of 1.8 mm
Pedical highly reflexed	13 + 10 mm
Seeds/pod	1, rarely 2
Seeds	Kabuli type (beaked, ramshead), strongly wrinkled and ribbed. Surface rough. 14x10 mm
Seed weight	49 seed/ounce/28.35 gr
100-seed weight	57.8 gm (1997-98 crop)
Seed canning quality	S&W quality = Private Label: Export # 1
Seed color	Light Beige (See text, Page 4)
Leaves	10-15 toothed leaflets/rachis; rachis 40 mm; leaflets 10x5 mm
Flowers	White, typical Kabuli type
Pubescence	Much glandular pubescence on leaves and pods
Plant appearance	Semi-erect
<i>Ascochyta</i> blight reaction	Resistant (but not immune) in California and Washington State
<i>Fusarium</i> wilt reaction	Susceptible