



UNIVERSITY OF IDAHO  
College of Agriculture

*Idachief  
and Idagem*



**TWO NEW  
SNAP BEANS  
RESISTANT TO  
CURLY TOP  
AND MOSAIC**

**IDAHO  
AGRICULTURAL  
EXPERIMENT  
STATION**

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# Idachief and Idagem

## Curly top- and mosaic-resistant snap beans

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Snap bean seed production in the United States is presently centered in southcentral Idaho and is restricted in area by the curly top virus (1). This virus is transmitted by the beet leafhopper, *Circulifer tenellus* B., and although the leafhopper population varies from year to year and the consequent losses are sporadic, the threat of loss is always present.

Snap bean varieties vary widely in tolerance to infection with the curly top virus, but none of those presently grown extensively is sufficiently tolerant to escape more than a moderate epiphytotic. The variety Idelight is resistant to curly top and seed-borne mosaic, yields very well and produces a high percentage of 4-sieve pods of excellent quality (2). But it has a colored seed coat that limits its use primarily to home consumption, fresh market or commercial freezing.

In 1966, seed of a number of white-seeded, curly top- and mosaic-resistant snap beans was distributed among interested commercial seedsmen for seed increase and evaluation. The agreement was that any line or lines proving to be of commercial value would be officially released and named. Two of these lines appear to be suitable for commercial processing, and have been named. The breeding line experimentally tested as XIda 121-13, including the sub-lines XIda 121-13-1 and XIda 121-13-2, is named IDACHIEF. The breeding line tested under the experimental designation XIda 3919, including the sub-selection XIda 3919-1, is named IDAGEM.

### IDACHIEF

The white-seeded variety Idachief (XIda 121-13) will provide a curly top- and common bean-mosaic-resistant snap bean suitable for canning especially in areas where curly top occurs as well as in other areas where it is adapted.

#### Pedigree and Disease Resistance

Idachief was developed from a cross made in 1955 at the University of Idaho Bean Research Laboratory. The parents were J-31 (D66) and a green-seeded, dry-edible bean type similar to Flageolet a Grain Vert. Selections were continued through eight generations before increasing the seed in bulk for distribution.

Fig. 2. Idagem is very prolific and produces medium green pods with good internal flesh color. The pods are medium sieve. The plant when heavy with pods tends to spread slightly.



The breeding line B-2008 was developed by the United States Department of Agriculture and released for experimental trials. This line was not named nor was it released for commercial production. It was curly top susceptible.

Idagem is resistant to the curly top virus and to the type and A strains of common bean-mosaic virus. Idagem has also remained relatively free of infestation and damage by the two-spotted mite, both in Idaho and in the Columbia Basin of Washington, when adjacent breeding lines and varieties were heavily infested and damaged.

#### **Plant Habit**

The plants of Idagem are moderately erect with some tendency to spread (Fig. 2). The plant ranges from 16 to 18 inches tall and when the pod set becomes heavy, the width may be as great as 22 inches. The foliage is dark green. Pod placement is from the lower center through the upper portion of the plant with some lower pods touching the soil. The set is heavy and concentrated with good mechanical harvest potential.

#### **Pods**

Pods of Idagem will grow to medium sieve while still retaining good quality. Seed and fiber development are relatively slow. The pods are straight,  $4\frac{3}{4}$  inches long, smooth and becoming moderately creaseback in 5-sieve. The seed cavities are small and the pods fleshy. The external pod color is good, usually being considered to be a medium dark green, with very good internal dark green color. The pods are distinctly pubescent.

#### **Quality**

The canned Idagem pods are medium dark green and the liquor is clear. Flavor and texture are good and the pods are stringless. Overall canned quality has compared very favorably

used snap bean varieties. The flavor and texture are good. The frozen product has good color uniformity but has a slightly light internal flesh color. The frozen pack is attractive, however. Seed and fiber development are satisfactorily slow and the pods are stringless. Idachief should be harvested to obtain a peak production of 4-sieve pods.

### Seed

Idachief averages 110 seeds per ounce. The seed coat is white and the general seed quality is probably above average.

## IDAGEM

The white seeded snap bean variety Idagem (XIIda 3919) will provide a snap bean of suitable quality for canning and freezing. It is a prolific variety. Internal flesh color is sufficiently dark green to permit commercial freezing. It also provides an attractive canned product. The plant is intermediate in height, however, and the pods are set lower than is desired.

### Pedigree and Disease Resistance

Idagem was developed by pureline breeding from a cross made in 1953 between J-44 (D66) and B-2008. Progeny were carried through nine single plant generations before being increased in bulk.

The University of Idaho breeding line J-44 has a colored seed coat and is resistant to the type (BV1) and the A (BV1A) strains of common bean-mosaic virus and to the curly top virus. J-44 was derived from the same cross which produced J-31, and the parentage involved is detailed in the pedigree section describing Idachief.

Fig. 1. Idachief is slim-podded and prolific. The plant is upright and sturdy with the pods set in the middle and upper part of the plant.



The University of Idaho line J-31 has a colored seed coat and is resistant to the curly top virus as well as the type (BV1) and the A (BV1A) strains of the common bean-mosaic virus. The A strain is also referred to as the New York 15 strain of common bean-mosaic virus. J-31 was derived from a cross of a third generation selection of D29 with Burpee's Stringless Greenpod. The parentage of D29 was Tendergreen crossed with a fourth generation selection of B-64. The B-64 selection came from a cross between a common bean-mosaic-resistant refugee type, W-80, and an F<sub>1</sub> hybrid (B-05) derived by crossing Burpee's Stringless Greenpod with curly top-resistant Burtner's Blight Proof. The development of the curly top- and common bean-mosaic-resistant Idachief traces through more than 35 years of the University of Idaho bean improvement program.

Idachief is resistant to the curly top virus and to both the type and A strains of common bean-mosaic virus. It appears to have a moderate tolerance to powdery mildew (*Erysiphe polygoni* DC.) and to some, but not all, traces of rust (*Uromyces phaseoli typica* Arth.).

#### **Plant Habit**

Idachief plants are sturdy, upright to very slightly spreading and vigorous (Fig. 1). The foliage color is light to medium green. Plant height at the Twin Falls Branch Station and in cooperative trials in other areas has been from 18 to 22 inches, with slightly greater spread.

#### **Pods**

Pods of Idachief are small to medium sieve at prime maturity and range from 5 to 5 $\frac{3}{4}$  inches in length. They are past prime at full 5 sieve, but hold quality very well through large 4 sieve or small 5 sieve size. In cross section, the pod approaches round but in the fancy stage the ratio of the width (suture to suture) to thickness approximates 1.05. Even fully 5-sieve pods should have a width to thickness ratio greater than 0.95 and hence would be only very slightly over-round. The pods are considered a medium green color of satisfactory intensity for commercial canning and possibly for commercial freezing. Idachief pods are fleshy, with some occasional slight interlocular cavitation, medium dark internal color and with slow fiber and seed development. They are smooth, straight, relatively glabrous and of good flavor and quality. The pods are borne from midheight to high on the plant and the set is concentrated.

#### **Quality**

Idachief pods, when canned, are slender, round and attractive. The color is medium green and is uniform among the pods. The liquor in the can is clear. In processing trials in which the canned product was graded according to USDA or higher standards, Idachief has compared very favorably in quality with several widely

with standard canning varieties. The frozen product has good quality including acceptable color except for those processors who require a very dark green product. Maximum yield of prime quality pods usually occurs when slightly less than 50 percent of the pods are 5-sieve and over. Idagem, therefore, should be considered in the medium sieve class.

### Seed

One ounce of Idagem seed will contain 110 seeds on the average. The seed coat is white and germination characteristics are good.

## SUMMARY

Any canner who wishes to pack a small sieve bean of medium green color and high quality should consider Idachief for trial. It has the plant habit, yield potential and quality characteristics necessary for successful canner production. In an area where curly top can be a limiting factor in production, Idachief can be grown without danger of loss due to the disease. It will produce a raw product which, if harvested at proper maturity, is necessary for a high-quality canned product. It is well-adapted to mechanical harvest.

Idagem will produce a canned or frozen product of somewhat darker green color than Idachief and in most situations may yield somewhat more than Idachief. Idagem will produce 5-sieve pods in prime stage. The plant habit and location of pods on the plant are not as desirable as the Tendercrop types, but are equally as good as many other processing varieties. This variety can be mechanically harvested very satisfactorily.

Resistance to curly top makes Idachief and Idagem doubly attractive to processors producing crops in areas where this disease is a threat.

## REFERENCES

1. Dean, Leslie L., and Lucien Laferriere. 1958. Diseases of beans in Idaho. Idaho Agri. Expt. Sta. Bull. 293.
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