'Autumn Gold' Lettuce

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Lettuce (*Lactuca sativa* L.) is planted in August and September for harvest in November and December in the San Joaquin

Valley of California and the desert districts of California and Arizona, respectively. This is a difficult period for lettuce production because of high temperatures at planting and during the first month or two of growth. The principal cultivars of crisphead lettuce for this period are 'Empire' and various derivatives, which are resistant to thermodormancy and premature bolting. They are, however, susceptible to various diseases and subject to spiraling and poor head shape. A breeding program was begun to combine disease resistance, horticultural quality, and high-temperature tolerance. 'Autumn Gold' is the first cultivar from this program.

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Origin

'Autumn Gold' was released in 1987. It was selected from progeny of the cross 'Empire' × 'Vanguard 75', made in 1976 to combine genes for resistance to bolting and lettuce mosaic virus (LMV) in a high-quality crisphead lettuce with good head shape and color. The F_1 was grown in the greenhouse. Single-plant selections were made in the F_2 in Winter 1977-78 at the U.S. Dept. of Agriculture Irrigated Research Center, Brawley, Calif. Single-plant selections were made in several F_3 families at the same location during the following winter. Single-plant selections were made in F_4 families planted near Bakersfield, Calif. (San Joaquin Valley). F_5 and F_6 families were grown in the fall at Bakersfield and also at Huron, a San Joaquin location ≈150 km farther north. Single-plant selections were made in both generations.

In 1983, 58 F_7 lines were planted in a nonreplicated trial, and 12 lines were selected for further trial. F_8 mass lots were tested in 29 trials at various locations in California, Arizona, and Colorado from 1984 to 1986. All 12 lines were derived from a single F_3 family that was homozygous for resistance to LMV. The three most promising

lines were compared in a late trial near Huron in 1986; 83-1480M had the least spiraling and lowest level of pink rib, a physiologic disorder, and was selected for seed increase and release as 'Autumn Gold'.

Literature Cited

Ryder, E.J. 1970. Inheritance of resistance to lettuce mosaic. J. Amer. Soc. Hort. Sci. 95:378-379.

van Bruggen, A.H.C., K.N. Jochimsen, and P.R. Brown. 1990. *Rhizomonas suberifaciens* gen. nov., sp. nov., the causal agent of corky root of lettuce. Intl. J. Systematic Bacteriol. 40:175-188.

Description

'Autumn Gold' has dull, dark-green outer leaves with an occasional slight yellowish cast, similar to 'Vanguard 75'. The interior is creamy yellow. Heads are firm to hard at maturity. When grown in areas of adaptation, heads are large enough to pack 24 per standard lettuce carton. In cooler areas, heads are likely to be small. The head is well rounded and well covered over the top, occasionally spiralled. The butt is usually flat, but occasionally slightly rounded. Ribs are flat to slightly raised. The core is large and the bases of the leaves overlap well. Leaves are sharply incised and indented, but not as sharply pointed as 'Empire'. Leaf margins are strongly undulate; texture is relatively soft, comparable to 'Vanguard 75'. Leaf surface is moderately crinkled. Seed is black.

Disease reactions

'Autumn Gold' has the *momo* gene for resistance to LMV (Ryder, 1970). It is susceptible to lettuce infectious yellows virus (LIYV) but becomes less yellowed than 'Empire' in the same environment. It is susceptible to big vein and corky root (*Rhizomonas suberifaciens* gen. nov., sp. nov.) (van Bruggen et al., 1990), but these diseases do not usually occur during the production period of this cultivar. Tipburn was detected in one trial in Santa Maria, Calif., but 'Autumn Gold' showed less tipburn than several fall cultivars in the San Joaquin plantings. It is susceptible to pink rib and rib discoloration; these occur if it is warmer than normal at harvest and may limit the production potential of the cultivar.

Adaptation and performance

The goal of the breeding program is to develop cultivars to replace the 'Empire' group. 'Autumn Gold' is superior to 'Empire' in the following: head shape, spiraling tendency, interior appearance, yellowing tendency from LIYV, and resistance to LMV and tipburn. It retains most of the bolting resistance of 'Empire'. It is more susceptible to rib discoloration and pink rib than 'Empire'. 'Autumn Gold' is best adapted for fall production in the San Joaquin Valley and in the desert valleys of California and Arizona. It should be harvested before reaching over-maturity to avoid pink rib and rib discoloration. It will not develop sufficient head size in cooler districts and time periods.

Availability

'Autumn Gold' has been officially released, and seed should be available in commercial quantities from seed companies.