

Star-of-Bethlehem

(*Ornithogalum umbellatum* L.)

Background

Star-of-Bethlehem is an escaped horticultural plant sold as a spring flowering ornamental. It is found in the northern United States and Canada. Star-of-Bethlehem is not very prevalent, but is a significant management problem in fields, turfgrass, landscapes, and roadsides that are infested. Star-of-Bethlehem is a bulbous perennial emerging in the early spring and maturing in late spring (Figure 1) that is classified as a monocot in the lily family. The plant (including bulbs) is poisonous if ingested by humans or livestock.



Figure 1. Thick clumps of bulbs, the primary means by which star-of-Bethlehem reproduces and spreads.



Figure 2. Erect, narrow, green leaves have a grass-like appearance.



Figure 3. Six white petals give the flower the appearance of a star.

Identification

- Leaves: basal, erect, and linear (grass-like); green and fleshy with prominent whitish midrib (Figure 2); originate from central bulb.
- Flower: 6 white petals with a green stripe on the underside of each petal (Figure 3).
- Reproduction: seed production in North America is rare; underground bulbs (bulblets) are produced around the parent bulb each year.
- Synonyms: summer snowflake, star-flower, snowdrops, nap-at-noon; similar to wild onion or garlic but does not have the same odor.

Since seed production is rare, the key to control is through management of the underground bulbs. Some fields have an estimated 37 million bulbs/acre with each main bulb able to produce as many as seven axillary bulbs (bulblets). Star-of-Bethlehem is typically found in no-till production but can also be found in reduced-tillage systems with germination of bulbs from 3 to 4 inches deep. The thick vegetation and bulb density impedes planting practices and can reduce crop establishment and vigor.

The bulbs can comprise up to 8% of the total soil volume in the top 3 inches of soil, which impacts soil-to-seed and soil-to-root contact as well as water availability. High bulb densities can create or accentuate droughty plant conditions.

Limited information is available on star-of-Bethlehem outside of the horticultural industry. The impact of any herbicide on the long-term survival of this species is not known.



Figure 4. After two years of management with herbicides, differences in the infestation of star-of-Bethlehem are evident.

Star-of-Bethlehem Management with Herbicides

Research was conducted in 2002 and 2003 by Southern Illinois University to evaluate various herbicides applied in the spring for control of star-of-Bethlehem prior to planting corn and soybean. In soybean, Gramoxone Max, Roundup UltraMax, Valor, Authority, and Canopy XL provided excellent (>95%) control of star-of-Bethlehem by 28 days after treatment (Table 1). However, star-of-Bethlehem control was less than 25% from all treatments except Gramoxone Max when evaluated one year later.

Table 1. Star-of-Bethlehem control in soybean.

Herbicide	Percent Control	
	28 DAT	Next spring
Gramoxone Max	99	94
Valor	99	5
Authority	98	8
Canopy XL	97	0
Roundup UltraMax	73	23
Harmony Extra	55	15
Harmony GT	50	0
FirstRate	44	10
Classic	18	8
2,4-D	10	0
Aim	3	0
LSD	25	15

Table 2. Star-of-Bethlehem control in corn.

Herbicide	Percent Control	
	14 DAT	Next spring
Gramoxone Max	97	70
Sencor	75	0
Atrazine	70	0
Roundup + 2,4-D	59	5
Callisto	51	9
2,4-D	48	3
Balance Pro	44	1
Harmony GT	41	8
Roundup UltraMax	39	15
Basis	36	0
Hornet	31	5
LSD	14	14

In corn studies, only Gramoxone Max controlled greater than 90% of star-of-Bethlehem by 14 days after treatment (Table 2). Tank mixtures of selected herbicides offered little to no improvement in star-of-Bethlehem control. Similar to the soybean study, only Gramoxone Max provided significant control of star-of-Bethlehem the next spring.

A separate study was conducted to determine the effect of increasing herbicide rate on star-of-Bethlehem control. Increasing the rate of Gramoxone Max from 1.33 to 2.0 pt/A increased star-of-Bethlehem control the next spring. There was little to no improvement in star-of-Bethlehem control from increasing the rate of Roundup UltraMax from 26 to 52 oz/A or the rate of 2,4-D from 1.0 to 2.0 lb/A.

Summary

Star-of-Bethlehem is an emerging weed problem that will likely continue to spread into agricultural sites where spring control prior to bulb formation is not practiced. Once established it can have a significant detrimental effect on crop planting and growth. Although several herbicides provided good burndown control of star-of-Bethlehem, only Gramoxone Max resulted in a reduced population the following spring. Scouting for early detection of this weed species and prompt implementation of control measures are critical. Spring tillage during vegetative growth yet prior to bulb formation may provide some control. However, tillage has been reported as aiding in the spread of the species throughout a field as well. Research relating to the timing of herbicide applications or tillage is in progress.