

1944

## The Spread of Perennial Sow Thistle in Iowa

Ada Hayden  
*Iowa State College*

*Let us know how access to this document benefits you*

Copyright ©1944 Iowa Academy of Science, Inc.

Follow this and additional works at: <https://scholarworks.uni.edu/pias>

---

### Recommended Citation

Hayden, Ada (1944) "The Spread of Perennial Sow Thistle in Iowa," *Proceedings of the Iowa Academy of Science*, 51(1), 199-216.

Available at: <https://scholarworks.uni.edu/pias/vol51/iss1/17>

This Research is brought to you for free and open access by the IAS Journals & Newsletters at UNI ScholarWorks. It has been accepted for inclusion in Proceedings of the Iowa Academy of Science by an authorized editor of UNI ScholarWorks. For more information, please contact [scholarworks@uni.edu](mailto:scholarworks@uni.edu).

**Offensive Materials Statement:** Materials located in UNI ScholarWorks come from a broad range of sources and time periods. Some of these materials may contain offensive stereotypes, ideas, visuals, or language.

## THE SPREAD OF PERENNIAL SOW THISTLE IN IOWA<sup>1</sup>

ADA HAYDEN

Sow thistle is not a thistle as the common name implies, but it belongs nevertheless to the Thistle Family, Compositae. The genus *Sonchus*, according to Hegi (1931), is widely distributed in cultivated parts of the temperate and even the subtropical world, and the four ruderal species, now extending their range in North America, are found in Europe, Asia, parts of Africa, and South America. They include the perennials *Sonchus arvensis* L. and *Sonchus arvensis* L. var. *glabrescens* Guenth., Grab., and Wimm. as well as the annuals *Sonchus asper* (L.) Hill and *Sonchus oleraceus* L.

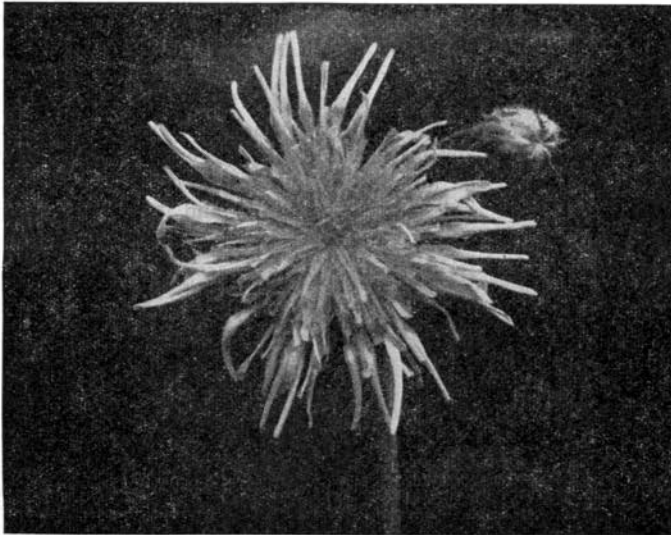


Fig. 1. A head of the hairy-headed perennial sow thistle (*Sonchus arvensis*)

In response to letters of inquiry sent out to County Extension Directors in Iowa for information concerning the spread of perennial sow thistle, a considerable number of specimens of annual sow thistle were received. Other inquiries as well as labelled specimens in herbaria, indicated that the perennial varieties are not generally distinguished from each other and from the annual species. Since the perennial varieties are officially designated as noxious weeds in Iowa

From the Botany and Plant Pathology Section, Iowa Agricultural Experiment Station<sup>2</sup> and the Department of Botany, Iowa State College.

<sup>1</sup>Journal Paper No. J-1208 of the Iowa Agricultural Experiment Station, Ames, Iowa. Project No. 366.

<sup>2</sup>The Fish and Wildlife Service (U. S. Department of the Interior), Iowa State College, Iowa State Conservation Commission and the American Wildlife Institute cooperating.

(Melhus, Porter and Sylwester, 1943), it is important that persons concerned with agricultural pursuits be able to recognize such weeds before they become established.

#### DISTINGUISHING CHARACTERISTICS

The two perennial sow thistles occurring in Iowa have heads consisting of deep yellow florets in contrast with the pale yellow florets of the annual sow thistles, whose heads are also smaller in diameter. The most conspicuous character which distinguishes the two perennial varieties, and from which they derive their common names, is the presence or absence of glandular hairs on the involucre and peduncles of the inflorescence (Figs. 2 and 3). The hairy variety is known as *Sonchus arvensis* and the smooth as *S. arvensis* var. *glabrescens*. The perennial species may be recognized in the vegetative state by the presence of a short crown which bears both horizontally running and vertically descending roots which, according to the researches of Stevens (1924), may reach a depth of fifteen feet (Fig. 4). In distinction from the perennial, the annual sow thistles have only short tap roots bearing fibrous laterals. The perennials may further be distinguished from the annuals by the size and markings of the achenes; however, the fruits of the perennial and its variety closely

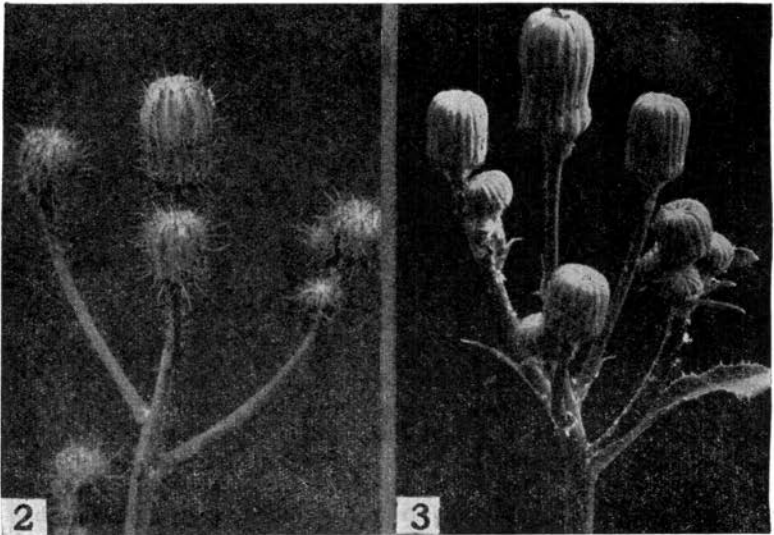


Fig. 2. A young inflorescence showing the glandular haired involucre and stems of the hairy-headed perennial sow thistle (*Sonchus arvensis*)

Fig. 3. A young inflorescence showing the smooth or glabrous involucre and stems of the smooth-headed perennial sow thistle (*S. arvensis* var. *glabrescens*).

resemble each other. The leaves of the perennial and the annual species are similar, but the leaf because of its variability in shape and indentation is not a dependable organ for purposes of identification.

That considerable diversity of nomenclature appears in the literature referring to the perennial species of *Sonchus* is shown by the following references: Deam (1940), Fernald (1910 and 1928), Palmer and Steyermark (1935), Rydberg (1932), Small (1921), Long (1922), Pretz (1923), and Stevens (1922). The names used in this paper are based upon the references in the herbarium data below. Whether the present concept of relationships will prevail or whether further ecological and monographic studies of the European perennials and their American counterparts will further change these concepts, field and laboratory observations may determine.

#### INTRODUCTION AND DISPERSAL IN NORTH AMERICA

The perennial sow thistle, commonly known as *Sonchus arvensis* L. and of cosmopolitan distribution, was known to Pursh in North America in 1814. It was found growing among rubbish in cultivated grounds. Darlington (1859) states that it was sparingly introduced along the seacoast. Fletcher, in 1894, reported it alarmingly abundant in maritime provinces in Canada. A specimen was collected by S. A. Beach at Geneva, New York, in 1892 (I. S. C. 14,764), and one from

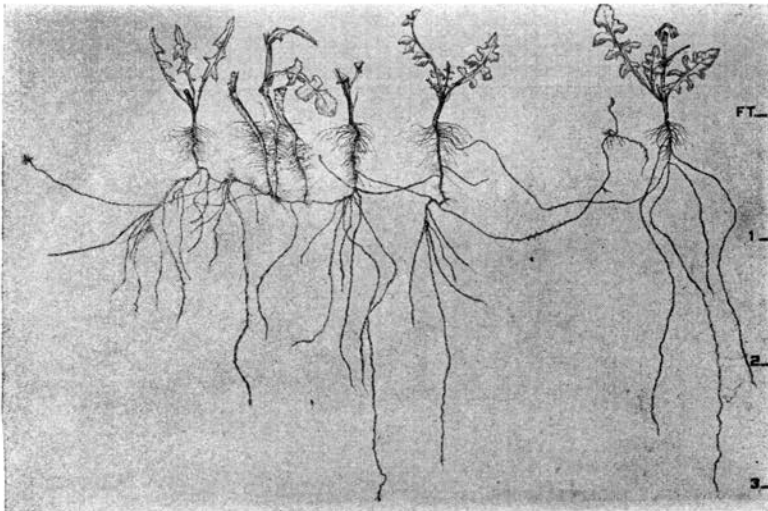


Fig. 4. The subterranean root system of a single perennial sow thistle plant constituting a colony. The thick vertical storage roots bear lateral and terminal absorbing rootlets, and the horizontal or arching roots bear upright aerial shoots.

Plymouth, Massachusetts by J. W. Blankinship in 1894 (I. S. C. 34,743). Stevens collected the first specimens from North Dakota in 1916. - The data published by Stevens (1924) indicate that the general tendency to spread has followed the initial appearance of the plant.

The smooth variety, *Sonchus arvensis* L. var. *glabrescens* Guenth., Grab., and Wimm. made its appearance somewhat later than the typical variety *Sonchus arvensis*. Fernald and Wiegand in 1910 reported specimens received from Maine in 1894 and 1896, and from Massachusetts and Ohio in 1902. Pretz in 1917 found the smooth-headed *Sonchus* in Lehigh County near Allentown, Pennsylvania, where he had made extensive investigations for years. Its spread was so marked that by 1921 there was a greater number of collections made from areas more widely separated than in any previous year, nearly as many as from 1917 to 1920. Specimens sent by Stevens in 1922 from North Dakota to the U. S. National Museum and to New York Botanical Garden were said to be new to these herbaria. By 1924 Stevens described the range of perennial sow thistle in North America, based upon herbarium data and manuals as inclusive of the New England States, all of New York, Michigan, Wisconsin, Minnesota, about half of North Dakota, most of Pennsylvania, extending into New Jersey and Delaware, the northern parts of Ohio, Indiana, Illinois, Iowa and north-eastern South Dakota; also scattered localities are represented in

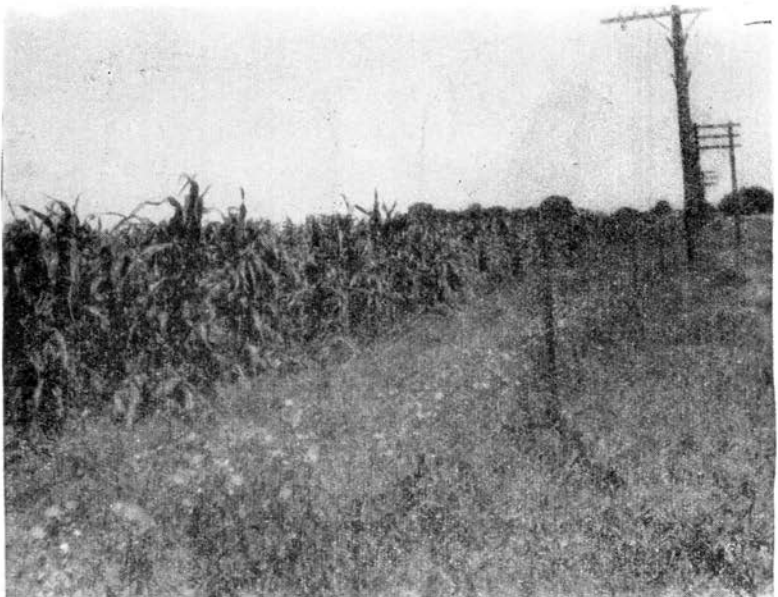


Fig. 5. Perennial sow thistle protected by a fence is invading a cornfield. The roadside has been recently mowed.

the Rocky Mountain regions from Montana to New Mexico, and in Washington and British Columbia. The distribution maps in the Flora of Indiana (Deam 1940) and data from specimens in the Herbarium of Missouri Botanical Garden indicate that the range has been extended southward to the southern boundaries of Ohio, Indiana, Illinois, and the northern third of Missouri.

#### THE PERENNIAL SOW THISTLE IN IOWA

*The First Records*—Pammel and King in 1913 showed in the Weed Flora of Iowa a map on which the presence of perennial sow thistle was indicated in Johnson County, Boone County, and on the border line between Palo Alto and Pocahontas Counties. In the second edition of the Weed Flora of Iowa, in 1926, Pammel and King state: "It has been noted in a few localities in Iowa, as at Spencer (Clay Co.) along the right-of-way of the C. M. and St. P. Railway, at Waukon on a dump heap, and at Postville (1925) on the right-of-way of the C. M. and St. P. Railway (Allamakee County). In 1925 Dr. B. Shimek had reported it at Clinton and Mason City and Dr. T. H. Macbride on the C. R. I. and P. Railway near Iowa City (Johnson Co.)."

The first collection of *Sonchus arvensis* for Iowa in the herbarium of Iowa State College was that of Rev. W. D. Spiker, in 1925, who was making a study of plants of Chickasaw County. In July of the



Fig. 6. Leafy rosettes of perennial sow thistle uninjured by mowing.

same year, Dr. Shimek collected the smooth variety *glabrescens* along an upland road two miles north of Muscatine, and in August, Dr. Pammel preserved a specimen from near Waukon in Allamakee County. In 1926 Don Griswold obtained a plant of the smooth variety growing along the railroad track at Clarinda, in Page County, and Wm. F. Watkins made a collection from Northwood in Worth County. So at the end of the year 1926, the perennial sow thistle had been located on the northern, the eastern, and the southern boundaries of Iowa.

During the growing seasons of 1926 and 1927, a considerable number of specimens of perennial sow thistle were received from correspondents by the Botany Department of Iowa State College. A field near Kensett in Worth County had ten to fifteen acres invaded by sow thistle. Interest in the spread of this plant led to requests for county surveys. While making a survey in Fayette County, perennial sow thistle was located by the writer in Randalia, Hawkeye, West Union, Oran, and Waucoma and in Mitchell County at Mona, St. Ansgar, Osage, and Riceville. No colonies were seen along highways or country roadsides at this time, nor on railroad right-of-ways between towns. The principal habitats included were lumber yards in which plants were seen growing around piles of posts, among rubbish such as loose shingles, tangled wire, along the walls of buildings located near avenues of transportation such as warehouses, depots, railway stations, oil storage tanks, between rails and ties of railroads, and around stock shipping yards. At Mona, thistles which were growing near a railroad station had spread into a garden in town and a cornfield across the way from the station. After these two county surveys, a campaign of eradication was organized in those counties by their County Extension Directors. After twelve years, on August 9, 1939, the towns in Fayette and Mitchell Counties where the perennial sow thistles were found, were again visited and thistles were still present in the original localities in all except Oran and Waucoma. The size of the colonies had increased by root growth, but few seeds were found and the weed did not appear to be spreading rapidly.

*Early Habitats of The Migrant*—From the summary of distribution data by counties on pages 11 to 20 a considerable number of environments may be listed:

- I. Around buildings:
  - Beet sugar refinery 1, cement plant 1, elevators 3, greenhouse 1, lumber yards 9, oil tanks 2, seed store 1, warehouses 3.
- II. Avenues of transportation:
  - Alleys 3, city lot 1, fences 37, junk yards 2, lime pits 2, machinery 2, paved highways, secondary roads, railroads in towns—especially spurs to lumber yards 10, warehouses 3, refineries 1, oil tanks 2, rural mailbox stops 4, stockyards 2.
- III. Agricultural crops:
  - Corn 2, clover 2, oats 2, sugar beets 1, hay 1, soy beans 1.

## IV. Rubbish:

Brush pile 1, loose boards 2, tangled wire 1, city dump heap 2, woodpile 1.

## V. Lake shores 4, sloughs 5.

*Environments Favorable to Naturalization*—All of these environments are potential culture beds for the dispersal of thistle plants. A pile of old iron, a post, or the side of a warehouse may serve as an obstacle to arrest seeds which parachute through the air, as well as to furnish shade which lessens the evaporation of moisture from the soil and thus provides a favorable environment for the germination of seeds which grow readily in moist places. Weeds growing around wood piles, along fences, around posts, telephone poles, and public buildings such as elevators and warehouses are seldom or only partially cut and thus serve as seeding centers from which the plants migrate. A seedstore in Allamakee County had been known to discard seed screenings on the railroad tracks behind the store where a large patch of perennial sow thistles was growing. Whether the seedstore or the railroad transportation facilities was the source of its introduction is not known.

Perhaps the most serious source of the spread of perennial sow thistle is the lime pit when thistles are growing in or near it. The

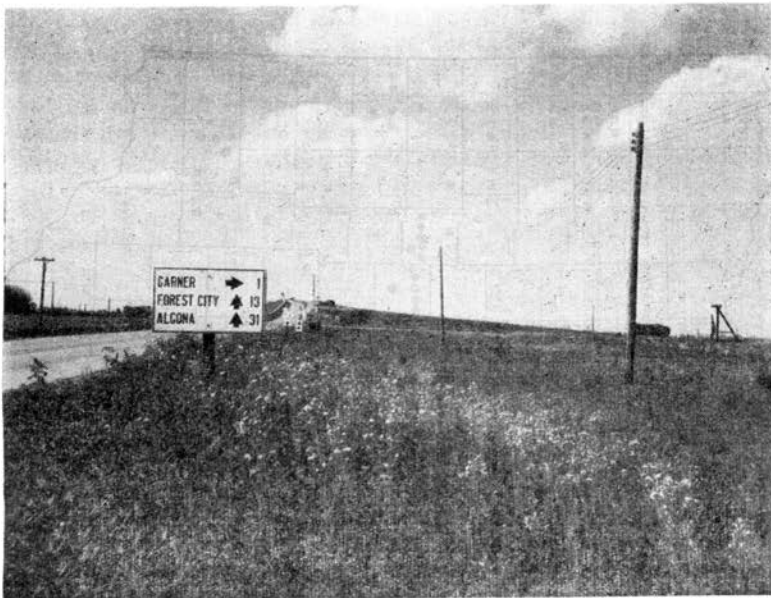


Fig. 7. A vigorous colony of smooth-headed perennial sow thistle growing among clover and timothy along Highway 69. It has spread nearly to the fence.



County Extension Director of Floyd County in 1928 wrote concerning the source of lime available at the beet sugar factory in Cerro Gordo County: "Our cheapest source of lime in this county is the refuse lime from the sugar factory at Mason City. Every year this lime is run out into a big pit enclosed by an earth dam. Yesterday it was reported to me by one of our farmers who had been getting lime from this source that there is a growth of perennial sow thistle adjoining the lime pit and the seeds are flying everywhere." The hazard is obvious. In 1939, just north of Mona in Mitchell County where the Illinois Central Railroad intersects with Highway 218, there was a depression and drainage ditch containing waste lime. *Sonchus arvensis* was growing luxuriantly in the lime as well as producing seed. Farmers frequently obtain lime from such sources.

EVIDENCE OF NATURALIZATION IN IOWA

*Extension of range*—During the period from 1933 to 1943 the increase of colonies along paved highways has been observed. Between Ruthven and Spencer, a distance of fifteen miles, ten patches have been seen along Highway 18. The first colony was reported in Clay County by Dr. Pammel in 1925; to this extent the thistles have spread in eighteen years. From Huxley to Garner on Highway 69, a distance of about eighty-four miles, more than twenty infested areas were counted. In 1940 four colonies were observed just north of Huxley on

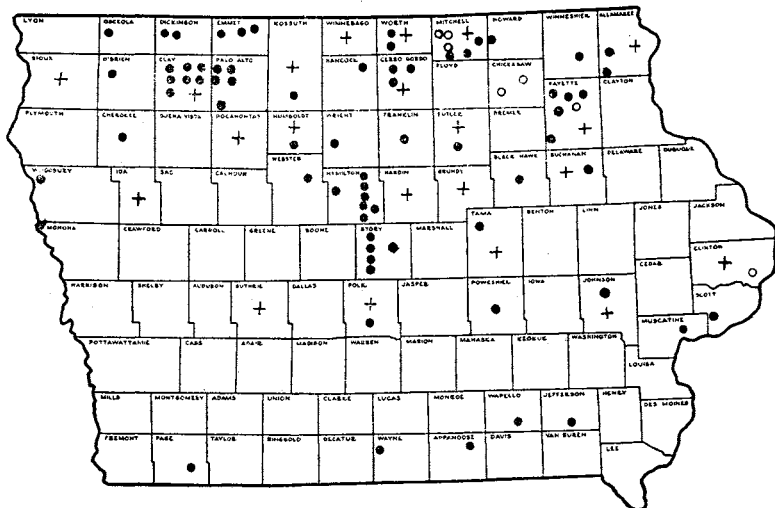


Fig. 8. A map of Iowa showing records of distribution for perennial sow thistle. Open circles represent *Sonchus arvensis* based on herbarium data. Black dots indicate herbarium records for *S. arvensis* var. *glabrescens*. The crosses represent field observations without specification of variety, and without herbarium records.

the west side of Highway 69. In July, 1941 two of the patches extended from the shoulder of the highway to the fence and were invading an oatfield. The roadside and the oatfield had recently been cut and some of the plants of sow thistle were bound in the shocks. The distance between the last two colonies measured by the mileage meter of a car was three-tenths of a mile. Two patches about one mile north of Ames on Highway 69 were separated by one-fourth of a mile (Fig. 5). Both were invading oatfields in 1941.

In diverse places of initial growth, but mostly in the vicinity of industrial activity, the colonies growing close to buildings, often in the shade, in rubbish and along railroad tracks do not have dissemination facilities afforded by cultivation and mowing. They frequently grow through the season uncut or with but a single mowing. Some plants, partly shaded, growing under old shingles in a lumber yard at Randalia in Fayette County in 1939, appeared not very robust. The colony had apparently neither spread nor increased in the twelve years since it was discovered in 1927. This condition of inactivity may be observed commonly in isolated patches.

A community of interpollinating colonies was observed in Randalia. A cluster about one square rod in size grew among tangled wire. Where the wire did not interfere, the patch was cut (See also Fig. 5). Some seeds were present. Another tuft, about fifty feet from the first colony and across the road from the colony in the lumber yard, had not been mowed and was growing in the open in favorable conditions of light and was seeding abundantly. It was inferred from such examples and from scattered colonies growing in Ruthven which were observed for several seasons, as well as from seeding plants studied in the greenhouse where bees had amply pollinated the flowers, and from unpublished experimental data, that cross-pollination is essential for seed production. The experimental studies of Stevens (1924) in North Dakota also show that cross-pollination is required to insure abundant seed.

The colonies occurring along the highways manifested vigorous growth (Fig. 7). The place of origin appeared to be the somewhat loose or semi-bare soil of the level or sloping shoulder of the highway, or sometimes in the depression at its side. The growth spreads radially and in many instances has been observed entering cultivated fields. The incoming achenes seem able to find suitable conditions for germination in openings in the grass, perhaps under the shade of pioneering weeds of the roadside which the thistles later supplant. The perennial sow thistle is itself not a pioneer of the roadside, but it sometimes grows with clover (Fig. 7), perhaps introduced with clover seed, which is employed as a nurse crop on highways. Pammel and King (1921) in a summary of weed seeds occurring in 8,478 samples analyzed between 1913 and 1921, found seeds of *Sonchus arvensis* in commercial seeds tested as follows: red clover 1, timothy 1, lawn grass 1, and miscellaneous 1. It was not reported in their summary of seed analyses for the preceding ten years. The thistle most commonly thrives in bluegrass sod, often sharing the space with quack

grass (*Agropyron repens*). Once established on the highway it receives the culture which the custodians of the highway bestow upon the roadside vegetation. About once in three weeks from the middle of June, when it begins to bloom, through August or September the roadside is mowed by machines. The cutting does not injure the rosettes of thistle leaves but merely clips off the leafy flowering stalks (Figs. 5 and 6). The plant is able to mature another flowering shoot in about three weeks' time so that many successions of flowers are stimulated by the mowing in contrast to only one seasonal flowering shoot produced by an uncut plant. The three-week period is time enough in midsummer for maturing of fruits, provided that the colonies are near enough to facilitate cross pollination. Since the mowing does not injure the food-manufacturing rosettes of leaves, the colony continues to grow vigorously and to enlarge its domain radially through the agency of buds on the running underground root system. Stimulated vegetatively by repeated cuttings, in several years it invades nearby fields by means of the root segments scattered in cultivation.

*Causes of dispersal*—The fruits are fitted with parachutes consisting of tufts of hairs. Small (1918) gives an ample account of the mechanics of the flight of plumed achenes. He states that as long as the relative humidity of the air remains above 77 per cent and the fruit does not encounter any obstacle, a horizontal wind at 1.96 miles an hour can carry the fruit of the dandelion to any distance. These data show that the plumed fruit is well fitted for migration by air for an indefinite distance. The almost constant winds of Iowa with a much higher velocity than that cited in the experiment insure seed dispersal.

Stevens (1924) notes that there is a difference in the persistence of the pappus in different thistle plants. Some fruits break away more readily than others and will fall nearer to their place of origin than those which have persistent parachutes.

Fruits attached to plumose parachutes will remain floating on water for a considerable period of time and so may be transported by water currents. The slightly barbulate surfaces of the hairs impart an ability to cling to either wet or dry surfaces. Such surfaces might be afforded by coats and feet of birds or furry animals, as well as wheels of cars, railroad trains, or farm implements. Too much care cannot be exercised in planting of pure agricultural seeds since impure seed is a common source of introduction of weeds. The careless disposal of screenings is also a source of danger.

The introduction of perennial sow thistle from one country to another, or even from adjacent vicinities appears to be accomplished by means of achenes, but intensive spread throughout cultivated fields occurs mainly by the distribution of small sections of the long running roots which are able to produce shoot-bearing buds at any point. (Fig. 4).

## PRINCIPLES OF CONTROL

*The importance of recognizing sow thistle*—Because in the vegetative stages the two varieties of perennial sow thistle superficially resemble wild lettuce, a common biennial plant, and because they first appear in inconspicuous places, this persistent weed often becomes established before it is recognized. It has even been cultivated in flower gardens in the state for its rather handsome and showy flowers. Early identification of all unknown weeds will prevent the introduction of serious competitors with crops, for these dangerous plants may be easily destroyed before they have become well established in the soil.

*Removal of weeds*—In 1913 the General Assembly of Iowa (Laws of Iowa, 1913) passed a law compelling the removal of certain weeds from the public highway and from the lands adjacent thereto. In the revised code of 1924, section 4818, (Laws of Iowa, 1924) designating the noxious weeds, sow thistle was mentioned for the first time.

If the perennial sow thistle plants were removed by spraying and the area reseeded (Sylwester and Porter, 1944) as soon as they appear, the danger of spreading by mowing machines and introduction into crops would be decreased.

The customary mowing of highways every three weeks stimulates the growth of new flower shoots so that when colonies become sufficiently near for natural pollination to take place, the fruiting and consequently the spread of the thistles will be greatly accelerated. The mown grass is doubtless beneficial in the capacity of a mulch for the germinable seeds. It is probable that mowing machines carry fruits along the highway from fruiting colonies, especially when the vegetation is wet, thus bringing the patches ever closer to each other so that cross-pollination will eventually become widespread and seed production, therefore facilitated.

*Limited mowing of the highway to encourage native cover*—Encouragement of native cover on the highway offers a solution to the problem of eradicating dangerous weeds such as Canada and sow thistles. Many highways in the state, particularly along highways 10, 18, 169, and 69 have still considerable strips of native grassland or true prairie. Typical prairie consists of an association of grasses and native herbs well adapted to Iowa soils which these plants, once widespread, have conditioned with humus. Their close formation leaves little opportunity for the invasion of travelling weeds, provided the prairie herbage is allowed to reach the stage of flowering and maturity of its seed before cutting. Thus many highways already have a protection of colorful, decorative herbage which should be cut only along the shoulder on the level with the pavement. This strip of prairie serves as a buffer between the open soil next to the pavement and the crops in the fields beyond the fence. Bluegrass, a plant not occurring in the original prairies, is commonly planted on the shoulder of the highways. Perennial weeds such as sow thistles and Canada

thistle thrive in bluegrass of roadsides and pastures because their deep seated root systems and rosettes of broad leaves enable them to crowd out the bluegrass. By mowing only the shoulder of the highway, the roadsides at first planted to bluegrass will gradually revert to native grassland and act as a protector of crops against the traveling weeds of highways.

#### SUMMARIZED DATA OF HERBARIUM RECORDS

The map (Fig. 8) showing the collective data of distribution for perennial sow thistle in Iowa is based upon specimens in the herbaria of the University of Iowa, the Iowa State College, Parsons College, and the personal herbarium of Dr. Earl D. Hubbard.\*

Records based upon field observations were supplied by letters from the County Extension Directors Mr. H. C. Aberg for Sioux County; Mr. M. H. Burns for Ida County; and Mr. E. Paul Wilson for Guthrie County. These data were supplemented by the field records of Sylwester and Porter (1944) who have prepared a distribution map of perennial sow thistle based upon field observations. It is shown by their map in 18 counties including Allamakee, Butler, Buchanan, Cerro Gordo, Clay, Clinton, Fayette, Grundy, Hardin, Humboldt, Johnson, Kossuth, Mitchell, Pocahontas, Polk, Tama, Winnebago, and Worth. The varieties were not specified.

*Sonchus arvensis* L., Species Plantarum 793, 1753. Hairy Perennial Sow Thistle

*Chickasaw Co.*, 1925, Spiker (118,270); roadside between Ionia and Chickasaw, not common, Aug. 5, 1926, Spiker (127,107), roadside between Ionia and Chickasaw, also occasional about New Hampton, not common, Spiker (127,212); *Clinton Co.*, Clinton, Findley (Herb. Univ. Iowa) 1925. *Fayette Co.*, Aug. 17, 1927, Hayden (129,804); also along the Rock Island Railroad track in stockyards at Randalia, July 18, 1937, Hayden 10,837; *Mitchell Co.*, Otranto Twp., Sec. 10, growing with hills of corn in a cornfield across the road from the railroad station, also in a nearby garden at Mona, July 20, 1927, Hayden 10,800; Otranto Twp., Sec. 31, growing in an oatfield, July 20, 1927, Rustad and Hayden 10,831; Otranto Twp., Sec. 11, along the right of way of the Illinois Central Railroad at the intersection with Highway 218, growing in bluegrass also in deposits of lime near a railroad water tank, Sept. 12, 1939, Hayden 9800; St. Ansgar Twp., Sec. 24, along a railroad track near onion warehouses, Sept. 10, 1939, Hayden 9808.

*Sonchus arvensis* L. var. *glabrescens* Guent., Grab., and Wimm., Enum. Stirp. Phan. Siles. p. 127. 1824. Smooth Perennial Sow Thistle See Torrey 22:92. 1922; and Rhodora 30:19. 1928.

*Sonchus uliginosus* Bieberstein, Flora Taurico-Caucasica 2:238. 1808.  
*Sonchus arvensis* L. var. *laevipes* Koch, Syn. Ed. 2:511. 1846.

\*The numbers in parenthesis are accession numbers of I. S. C. Herbarium.

*Allamakee Co.*, along C. M. and St. P. R. R., abundant in some places, a recent introduction, Aug. 22, 1925, Pammel 226; one mile west of Waukon, Aug. 18, 1925, Pammel (133,890); Post Twp., along the C. M. and St. L. R. R. track near a seed store in Postville where screenings were discarded, July 3, 1927, Hayden 10,827; Aug., 1928, Pammel and Johnson (137,822); *Appanoose Co.*, Taylor Twp., Sec. 6, about two miles west of Moravia by the mailbox in front of a farmhouse on the north side of the highway, Oct. 8, 1939, Hayden 9817; *Boone Co.*, Colfax Twp., about four miles west of Ames along the shoulder of Highway 30, Aug. 9, 1941, Hayden 8858. *Buchanan Co.*, along the roadside at a mailbox on the Murley Farm near Winthrop, August 17, 1940, Murley (160,039). *Butler Co.*, West Point Twp., Sec. 25, in a vacant lot along one of the main streets of Allison, Aug. 15, 1927, Hayden 10,826. *Black Hawk Co.*, East Waterloo Twp., along the railroad track near the station in East Waterloo, Aug. 1, 1927, Hayden 10,825. *Cerro Gordo Co.*, Lime Creek Twp., Sec. 29, northwest of Mason City in the fields of the beet sugar refinery, July 17, 1931, Hayden 10,801; Mason City around the cement plant, Sept. 1, 1931, Cratty (137,634); Mason City, edge of Buffalo Slough, Sept. 12, 1925, Shimek (Herb. S. U. I.). *Cherokee Co.*, along the Illinois Central Railroad tracks in the city of Cherokee near Willow Street, July 3, 1927. *Clay Co.*, Freeman Twp., Sec. 1, growing in sand along the southwest border of Lost Island Lake, July, 1934, Hayden 8855; Douglas Twp., about ten miles south of Spencer, a small patch on the shoulder of Highway 71, Sept. 17, 1936, Hayden 10,815; Sioux Twp., about three miles east of Spencer, a small patch growing on the side of Highway 18, was not observed before this year, Aug. 7, 1938, Hayden 10,821; Freeman Twp., Sec. 13, two miles west of Ruthven in bluegrass along Highway 18, Aug. 10, 1938, Hayden 10,822; Freeman Twp., about two miles west of Ruthven along Highway 18, in bluegrass sod, July 4, 1939, Hayden 9807; Meadow Twp., two miles north of Spencer along Highway 71, growing in bluegrass sod, Aug. 31, 1939, Hayden 9806; Meadow Twp., one mile north of Spencer along Highway 71, near a signboard, moist roadside in bluegrass sod, Aug. 31, 1939, Hayden 9803; Freeman Twp., Sec. 21, growing by a fence corner at crossroads, along a ditch which runs under a stone culvert, along Highway 18; this patch has been here for five years and has never been cut; sunflowers were competing with it in 1938 when it was less vigorous than before, June-Oct. 1934-1938, Hayden 10,820; Freeman Twp., Sec. 14, a patch about twelve by fifteen feet in diameter is established in the edge of a clover field at the southwest border of the Outlet of Lost Island Lake, July 15, 1942, Hayden 7962. *Dickinson Co.*, Lakeville Twp., Sec. 23, along the sandy shore of Lake Okoboji at Miller's Bay near the Flotie residence, Aug. 7, 1934, Hayden 10,823; Diamond Lake Twp., about five miles east of Silver Lake along Highway 9, Aug. 28, 1939, Hayden 9813. *Emmet Co.*, Estherville, July and Sept., 1927, Wolden (127,868 and 130,466); Lincoln Twp., Sec. 11, six miles west of Armstrong, Sept. 1, 1939, Hayden 9815; Armstrong, Grove Twp., Sec. 13, one mile east of Armstrong along Highway 9, Sept. 1, 1939, Hayden 9814. *Fayette*

*Co.*, Center Twp., Sec. 15, growing in a lumber yard at Randalia, July 18, 1927, Hayden 10,401; Union Twp., Sec. 8, growing in a lumber yard at West Union, July 27, 1927, Hayden 10,400; Union Twp., in R. R. yards near stockyard in West Union, July 17, 1927, Hayden 10,834; Eden Twp., Sec. 9, in lumber yard at Waucoma, July 17, 1927, Hayden 10,835; Windsor Twp., Sec. 30, near stockyards along R. R. track in Hawkeye, Hayden 10,836; Oran Twp., Sec. 15, along R. R. track near station at Oran, July 18, 1938, Hayden 10,838; Center Twp., Sec. 15, in lumber yard at Randalia, growing in grass along a fence, Sept. 9, 1939, Hayden 9804; Windsor Twp., Sec. 19, large patch beside a lumber yard along the C. M. and St. P. R. R. track, Sept. 9, 1939, Hayden (9805). *Franklin Co.*, Reeve Twp., Sec. 4, one and one-half miles south of Hampton, Aug. 6, 1941, Soultz (159,223). *Hamilton Co.*, Lyon Twp., about two miles north of Jewell along Highway 69, growing in bluegrass, July 12, 1939, Hayden 9818; Liberty Twp., about two miles north of Jewell along highway 69 in bluegrass, July 12, 1939, Hayden 9819; Ellsworth Twp., Sec. 16, on west side of Highway 69 in weedy bare soil at the entrance to a farm ¼ mile south of Little Wall Lake, July 19, 1939, Hayden 9816; Ellsworth Twp., Sec. 16, a well established patch about five years' old. Has borne no seed at any time observed. Along sw. bank of Little Wall Lake one mile south of Jewell, Aug. 4, 1938, Hayden 10,807; Liberty Twp., Sec. 28, along the cut-over grassy shoulder of Highway 69, six miles north of Jewell, no seed present, Aug. 4, 1938, Hayden 10,808; Freedom Twp., Sec. 6, a small patch of two or three plants along the left side of the road among annual weeds on the shoulder of Highway 20, Aug. 4, 1938, Hayden 10,809. *Hancock Co.*, Concord Twp., Sec. 30, on the right side of Highway 69 at the juncture of a road leading to Garner, growing in bluegrass and clover, July 19, 1939, Hayden 9809; south of the viaduct of the railroad near the junction of Highways 69 and 18, one mile west of Garner, Aug. 7, 1940, Hayden 8857. *Howard Co.*, Jamestown Twp., Sec. 30, growing along the railroad track at the eastern border of Riceville, Sept. 10, 1939, Hayden 9774. *Humboldt Co.*, Beaver Twp., Sec. 6, along the railroad track near the freight depot on the north side of Dakota City, July 27, 1940, Hayden 8853. *Jefferson County*, Liberty Twp., Sec. 36, Highway 1 south of Fairfield near Raney schoolhouse, July 7, 1933, Malcolm McDonald and Charles Gilly; Liberty Twp., about two miles south of Fairfield along a highway near a schoolhouse, Sept. 23, 1940, Hayden 8856; *Johnson Co.*, Iowa City, July 2, 1928, Pammel and Adams (132,855). *Kossuth Co.*, Irvington Twp., Sec. 1, by a lumber yard along Highway 169 in Algona, Aug. 1935, Hayden 10,830. *Mitchell Co.*, *Riceville*, Jenkins Twp., Sec. 25, along the C. & G. W. track beside the elevator, (the plants were still growing in the summer of 1937, Sept. 14), July 21, 1927, Hayden 10,832; Osage Twp., Sec. 23, along the I. C. R. R. tracks in Osage near warehouse growing up around some machinery, Sept. 10, 1939, Hayden 9801; Osage Twp., Sec. 23, in Osage at the entrance to a lumber yard, growing in bluegrass sod, Sept. 10, 1939, Hayden 9802. *Muscatine Co.*, along upland road two miles north of Muscatine, July 14, 1925, Shimek (Herb. S. U. I.).

*O'Brien Co.*, Lincoln Twp., four or five miles east of Sanborn, a small patch of thistles growing along the highway next to the fence, July 25, 1938, Hayden 10,811. *Osceola Co.*, Viola Twp., Sec. 11, two miles west of Sibley along the roadside at crossroads, a colony of two plants bearing no seeds, July 8, 1933, Hayden 10,814. *Page Co.*, Clarinda, Sept. 2, 1926, Griswold (125,810); Clarinda, Oct., 1926, Dyas (125,380). *Palo Alto Co.*, Highland Twp., Sec. 18, two small patches of ten or twelve plants are growing in between railroad ties in front of Spahn & Rose Lumber Yard, have been there for five years. Seed was observed on Oct. 23, 1938, June 20, 1934, Hayden 10,818; Highland Twp., Sec. 18, along roadside in a sod of *Agropyron repens*, a few rods from the C. M. & St. P. R. R. track on the north side of the highway, patch 12-15 ft. long has been cut, dug, or smothered more or less but still persists. It is at least five years old, has no seeds except when artificially pollinated, July 6, 1934, Hayden 10,816; Highland Twp., Sec. 17, scattered along the C. M. & St. P. R. R. track, Aug. 10, 1934, Hayden 10,817; Highland Twp., Sec. 6, scattered plants were growing along the sandy shore of Lost Island Lake west of L. I. Lake highway bridge, July 10, 1934, Hayden 10,819; Booth Twp., Sec. 17, scattered through a pasture north of the gravel highway northwest of Rush Lake, July 23, 1942, Hayden 7961; Highland Twp., Sec. 20, one mile east of Ruthven scattered through a soybean field, July 10, 1942, Hayden (7980). *Polk Co.*, south Des Moines, July 23, 1929, Pammel; Des Moines Twp., at the crossing of the R. R. tracks near a warehouse six blocks west of courthouse and one block south, July 18, 1930, Hayden 10,824. *Poweshiek Co.*, south of highway 6 and west of the M. and St. L. railroad track at Grinnell, July 26, 1943, Earl D. Hubbard. *Scott Co.*, Wolcott, Aug. 8, 1927, Adams (129,242); among weeds along the railroad, two miles east of Wolcott, Aug. 8, 1927, Shimek (Herb. S. U. I.) *Story Co.*, Nevada Twp., Sec. 7, a few plants growing near the I. C. R. R. station in Nevada, July, 1927, Hayden 10,833; Nevada, Sept. 16, 1927, Pammel (132,752); Nevada, stockyards, July, 1928, Pammel (132,797); Campus, Iowa State College, Ames, July 28, 1927, Johnson (132,828); Palestine Twp., Sec. 14, growing in bluegrass on a mown roadside on Highway 69, one mile north of Huxley, a small patch not noticed before 1938, Aug. 3, 1938, Hayden 10,805; LaFayette Twp., Sec. 14, one mile south of Story City on the grassy shoulder of Highway 69, a new patch not seen in 1937, Aug. 3, 1938, Hayden 10,806; Franklin Twp., Sec. 27, one mile north of Ames, on the cut-over west side of Highway 69—plants were between the shoulder and the fence—a small patch first seen in 1937, Aug. 4, 1938, Hayden 10,803; Franklin Twp., Sec. 27, two miles north of Ames on the cutover west side of Highway 69—the colony consisting of only a few plants was first seen this season, Aug. 4, 1938, Hayden 10,804; Franklin Twp., Sec. 34, about one mile north of Ames along the west side of Highway 69 in the fence-row, July 12, 1939, Hayden 9811; Washington Twp., Sec. 2, railroad yards at Kellogg Street, June 15, 1940, Hayden 8850; Franklin Twp., Sec. 34, one-half mile north of Ames opposite the W. Barr residence, growing along the roadside fence and invading the adjoining oatfield, July 15, 1940, Hayden 8852.



*Tama Co.*, Gladbrook, July 13, 1929, and July 23, 1929, Pammel (134,244 and 134,491); *Wapello Co.*, Pleasant Twp., about eight miles east of Ottumwa along Highway 34 at a mailbox in front of a farmhouse, scattered at intervals along the grassy roadside, Sept. 24, 1940, Hayden 8854. *Wayne Co.*, Benton Twp., about five miles west of Corydon on the shoulder of Highway 3, Sept. 26, 1940, Hayden 8851. *Webster Co.*, Colfax Twp., about five miles east of Fort Dodge, extending through a fence into a cornfield near a dwelling, Aug. 4, 1938, Hayden 10,810. *Winneshiek Co.*, growing in city dump, Aug. 1, 1933, Tolstead (144,-372); on the south side of the main street of Decorah at the side of a store in a vacant lot, Sept. 1, 1927, Hayden 10,829. *Woodbury Co.*, Sioux City Twp., a large patch in a lumber yard west of the intersection of Highways 75 and 20, July 26, 1938, Hayden 10,812; *Worth Co.*, Northwood, Aug. 24, 1926, Watkins (125,376); Manly, Aug. 28, 1927, Pammel (128,914). *Wright Co.*, Boone Twp., Sec. 18, a small patch along the right side of the road near the fence on Highway 60, near the entrance to Renwick, Hayden 10,813.

#### SUMMARY

Two perennial sow thistles, the hairy headed variety *Sonchus arvensis* and the smooth headed variety *S. glabrescens* occur in Iowa; combined field and herbarium data indicate that the perennial, without distinction of variety, is found in 46 of the 99 counties of Iowa twenty years after it was first observed. *Sonchus arvensis*, the eastern variety, is known to occur in only 4 counties. The western variety *glabrescens*, which is known to occur in 36 counties, appears to be the more aggressive of the two.

The first colonies seen in Iowa occurred along avenues of commerce. The thistles were first commonly located not in the rural districts but in towns, about railroad, lumber, and stockyards; near such buildings as warehouses, elevators, and seed stores; on city lots and alleys, in piles of rubbish, and around unprotected machinery.

During a ten-year period from 1933 to 1943, a marked increase in the distribution of perennial sow thistle has been observed along highways from which locations they are invading cropped fields and meadows.

Isolated colonies of perennial sow thistle seldom produce seed, but when the patches occur sufficiently close that cross-pollination may be effected, seed is abundantly produced and the dispersal of the weed is thereby accelerated; the spread of the colonies by vegetative means is facilitated by segmentation of the root system caused by cultivation.

The recognition and removal of the thistles from spots on the highway when they first appear will prevent their spread into nearby fields. Strips of prairie grassland should not be mowed until the end of the growing season, thereby providing a protective **buffer between crops** and the spreading weeds bordering the pavement.

Bluegrass, an introduced plant on the highway, should be allowed to revert by succession to native grassland, since native grassland, because of its greater stability, forms a more effective buffer against introduced perennial weeds than the less stable bluegrass which harbors them.

IOWA STATE COLLEGE  
AMES, IOWA

## PERTINENT LITERATURE

- Darlington, Wm. 1859. American weeds and useful plants. New York. (2 ed.)
- Deam, C. C. 1940. Flora of Indiana. Published by the Department of Conservation. Div. of Forestry. Indianapolis.
- Fernald, M. L. and K. M. Wiegand. 1910. A summer's botanizing in eastern Maine and western New Brunswick. Part II. *Rhodora* 12:145.
- Fernald, M. L. 1928. *Rhodora* 30:19.
- Fletcher, James. 1894. Canada Exp. Farms Rept. Ottawa.
- Groh, H. 1942. Perennial sow thistle and its smooth variety in Canada. *Scientific Agriculture* 23:127-130. Ottawa, Canada.
- Hegi, Gustav. 1931. *Illustrierte flora von mittel-europa*. Band 6, Teil 2.
- Laws of Iowa. 1913. Acts and resolutions of the Thirty-fifth General Assembly.
- Laws of Iowa. 1924. Acts and resolutions of the Fortieth General Assembly.
- Long, Bayard, 1922. *Sonchus uliginosus* occurring in the Philadelphia area. *Torreyia* 22:91-98.
- Melhus, I. E., R. H. Porter and E. P. Sylwester. 1943. Iowa laws relating to noxious weeds. Bull. 81-A. Iowa Dept. of Agr. State of Iowa. Des Moines. (Rev. 1943).
- Palmer, E. J., and J. A. Steyermark. 1935. An annotated catalogue of the flowering plants of Missouri. *Annals of the Missouri Botanical Garden* 22:375-358.
- Pammel, L. H. and C. M. King. 1913. The weed flora of Iowa. Bul. 4. Iowa Geol. Surv. Des Moines. (1 ed).
- Pammel, L. H. and C. M. King. 1921. Seed analyses of 1913 to 1921. Bull. 203. Iowa Agr. Exp. Sta. Iowa State College, Ames.
- Pammel, L. H. and C. M. King. 1926. The weed flora of Iowa. Bul. 4 Iowa Geol. Surv. Des Moines. (2 ed.) 23:79-85.
- Pretz, H. W. 1923. Additional notes on *Sonchus uliginosus*. *Torreyia*
- Pursh, F. 1814. *Florae Americae septentrionalis*. London.
- Rydberg, P. A. 1932. Flora of the prairies and plains of Central North America. New York Botanical Garden.

- Small, John K. 1921. Another *Sonchus* for America. *Torreyana* 21:100-101.
- Stevens, O. A. 1922. New records and other notes on North Dakota plants. *Bul. Torrey Bot. Club* 49:93-105.
- Stevens, O. A. 1924. Perennial sow thistle. *Bul.* 181. *Agr. Exp. Sta., North Dakota Agr. College, Fargo, North Dakota.*
- Sylwester, E. P. and R. H. Porter. 1944. Noxious and other bad weeds of Iowa. *Bul. P64. Agr. Exp. Sta.—Agr. Exten. Serv. Iowa State College, Ames.*