

***Rhamnus lanceolata* Pursh (Lance-leaved Buckthorn, Rhamnaceae), Its Distribution and Abundance in Illinois**

*John E. Ebinger, Loy R. Phillippe, and Paul B. Marcum

Illinois Natural History Survey, 1816 South Oak Street, Champaign, IL 61820

*Correspondence: jeebinger@eiu.edu

ABSTRACT

During the present study we searched for populations of *Rhamnus lanceolata* Pursh (lance-leaved buckthorn) throughout its known range in Illinois. Considered a relatively common species based on herbarium records, the authors, with a combined total of more than 112 years of field work in Illinois, have rarely encountered this species. During part of a larger study involving 80 native Illinois species, we searched for all of these species in most herbaria in Illinois, and a few outside the state, to determine potential population sites. More than 240 specimens of *R. lanceolata* were found representing 103 populations. Of the 103 populations identified from the herbarium search, we relocated 13 populations from eight Illinois counties. We are not sure of the normal habitat for lance-leaved buckthorn in Illinois, but it is probably a species of hill prairies, hill prairie/forest interface, associated limestone glades of hill prairies, ravines and brushy areas of savannas, and in northeastern Illinois, calcareous fens.

INTRODUCTION

About 11% of the native vascular plant species found in Illinois are officially listed as state threatened (73 taxa) or state endangered (251 taxa) while another 75 or so are considered rare, of special concern, or little is known concerning their status in Illinois (Illinois Endangered Species Protection Board 2015). In contrast, *Rhamnus lanceolata* Pursh (lance-leaved buckthorn) is considered common based on the number of herbarium records, and Jones (1945) considered it the "common species in Illinois." We determined there were about 103 populations for lance-leaved buckthorn based on more than 240 specimens located from a search of 19, mostly Illinois, herbaria. From this data we originally felt this species was too common to warrant an extensive study. However, many of the botanists we talked with said "they had only rarely encountered this species" while others mentioned "they had never seen it." Also, the present authors, with a combined total of 112 years of field work in Illinois, have rarely encountered this species in Illinois.

Rhamnus lanceolata, a member of the family Rhamnaceae (Buckthorn Family), has simple, alternate, lanceolate to elliptic leaves, the blades 3-8 cm long, 1.5-4 cm wide, with mostly 4 or more pairs of up-curved lateral veins, and margins finely serrulate with in-

curved teeth; petioles 4-10 mm long; the 4-merous, small unisexual flowers appearing with the leaves. We originally attributed the present lack of familiarity with lance-leaved buckthorn to this species being "overlooked," as it is a medium-sized shrub with characteristics similar to those found in a number of shrubby Illinois species. We are now of the opinion that *R. lanceolata* is now less common in Illinois than in the past. The study was undertaken to determine the present status of *R. lanceolata* in Illinois, and determine the possible reason or reasons for its decline.

METHODS

We reviewed the pertinent literature, discussed the species with local biologists, and visited most of the herbaria in Illinois and some larger herbaria in surrounding states to determine where Illinois populations of *Rhamnus lanceolata* had been collected. Listed below are the locations and acronyms of the herbaria where specimens were examined: Burpee Museum of Natural History, Rockford, Illinois (BUR); Chicago Academy of Science, Chicago, Illinois (CHAS); Chicago Botanical Garden, Glencoe, Illinois (CHIC); Northern Illinois University, DeKalb, Illinois (DEK); Eastern Illinois University, Charleston, Illinois (EIU); Field Museum of Natural History, Chicago, Illinois (F); Gray Herbarium of Harvard University, Cambridge, Massachusetts (GH); Univer-

sity of Illinois, Urbana, Illinois (ILL); Illinois Natural History Survey, Champaign, Illinois (ILLS); Indiana University, Bloomington, Indiana (IND); Illinois State Museum, Springfield, Illinois (ISM); Illinois State University, Normal, Illinois (ISU); Knox College, Galesburg, Illinois (KNOX); Missouri Botanical Garden, St. Louis, Missouri (MO); The Morton Arboretum, Lisle, Illinois (MOR); Western Illinois University, Macomb, Illinois (MWI); Natural Land Institute, Rockford, Illinois (NLI); Rockford College, Rockford, Illinois (RCH); and Southern Illinois University, Carbondale, Illinois (SIU). We also tried to determine the associated species, ecological requirements, and other data concerning lance-leaved buckthorn from label information on the herbarium specimens. Field searches during the growing season from 2010 to 2016 were undertaken throughout Illinois, visiting all known sites based on herbarium records. Nomenclature follows Mohlenbrock (2002).

RESULTS

A specimen collected by George Engelmann (# 13046, St. Clair Co.: Bellville, Apr 1832, MO-fl) is the earliest recorded collection of *Rhamnus lanceolata* we found for Illinois, the second was collected by Samuel B. Mead (# 173, Hancock Co., Augusta, 20 Apr 1842, F-fl). We found herbarium specimens of this species from 47 Illinois counties, most-

ly in the northern and central part of the state (Appendix). Earlier, Mohlenbrock and Ladd (1978) list 44 counties for this species including Richland, Schuyler and Winnebago counties where we have not recorded herbarium specimens.

Lance-leaved buckthorn's distribution in Illinois extends from Jo Daviess County in the northwest corner of Illinois south to Monroe County along the Mississippi River, and from Kane, DuPage, and Cook counties in northeastern Illinois south to Marion County. This distribution includes many of the Illinois counties in the prairie peninsula and almost all of the counties along the Illinois River and the northern three-quarters of the Mississippi River in Illinois.

Habitat recorded for *Rhamnus lanceolata* in Illinois, based on the information recorded from herbarium labels, varies extensively. Location information is short, in most instances only a few words; only rarely is information given concerning associated species, and habitat information is sometimes lacking. In the counties along the Mississippi River, many of the herbarium labels from specimens collected during the middle of the last century, indicate an association with hill prairies and rocky areas, (i.e. open wooded slope, hill prairie/wooded border, cliff face, wooded ravine, rocky ledge, bluff top, rocky woods). For specimens from the prairie peninsula of Illinois collected during the middle of the last century the listings are more diverse (i.e. wooded ravine, original prairie, hill prairie, base of wooded cliff, thickets, along creek, stream bank, wooded border, bank of swamp, low open woods, woods along creek). In Illinois, the natural habitat for lance-leaved buckthorn is probably hill prairies, the hill prairie/forest interface, the associated limestone glades of hill prairies, and ravines and brushy areas of savannas, and calcareous fens in northeastern Illinois.

We located no new populations of lance-leaved buckthorn but did relocate 13 populations in eight Illinois counties (Table 1). Of these, most were in counties associated with the Missis-

sippi and Illinois rivers (Calhoun, Fulton, Marshall, Morgan, Peoria, Pike, Tazewell) with only Kendall County being part of the prairie peninsula. Of these 13 populations four were from loess hill prairies, two in rocky openings and glades, two in wooded habitats, three were found on roadsides (mostly in forest), one each in a gravel prairie and in an open seeps (Table 1). Except for one population in Fulton County where we counted 18 individuals of *R. lanceolata* (Phillippe # 43072/ILLS), and another in Tazewell County where we encountered 65 individuals

(Phillippe # 43031/ILL), none of the remaining populations contained many individuals, usually just one to six shrubs were encountered.

DISCUSSION

As many of the herbarium records are from the early to mid 1900s the chances of finding viable populations was low. On most specimen labels map coordinates were not given and GPS readings were unknown. Generally, the collector listed the nearest town, or gave the distance and direction from the nearest town, or listed a state park or natural

Table 1. Populations of *Rhamnus lanceolata* relocated during the present study listed by county and giving the original collector, collecting number, and year collected, present habitat with latitude and longitude, our collecting number (Loy R. Phillippe), and the number of years the population has existed (first known collection to present).

County	First Collector collecting number/year	Present Habitat		Our number	Age
		Latitude	Longitude		
Calhoun	J. E. Ebinger 27373/1997	rocky glade, S-facing slope 39.06167	-90.61135	43427	20
	R. A. Evers 20772/1949	high quality loess hill prairie 39.23508	-90.71723	43435	68
Calhoun	R. A. Evers 338482/1953	rocky ledge 39.33464	-90.62067	43437	64
	R. A. Evers 99014/1969	roadside, woodland edge 40.3385	-90.4172	42505	48
Fulton	P. Shildneck 10959/1979	roadside, upland woods 40.67775	-90.13933	43072	38
	R. A. Evers 40317/1953	wooded ravine, W-facing 41.56686	-88.59311	43447	64
Kendall	D. Young s.n./1973	open seep in upland woods 41.64125	-88.41659	43449	44
	R. A. Evers 9160/1948	woods, bank of creek 41.09198	-89.20251	43349	69
Morgan	S. R. Hill 29861/1997	degraded loess hill prairie 39.86126	-90.36639	43051	20
	R. T. Rexroat 2173/1956	loess hill prairie 39.8728	-90.3975	43054	61
Peoria*	V. H. Chase 1631/1908	weedy roadside, some trees 40.92826	-89.98541	43345	109
	R. A. Evers 41287/1953	steep loess hill prairie 39.5548	-91.02363	43702	64
Tazewell	J. E. Ebinger 29544/2001	Manito gravel prairie 40.52851	-89.76963	43031	16

*The specimen of V. H. Chase 1631 (ILL) lists the locality in Knox County near Williamsfield, Truro Township, collected 10 May 1908. Though the collecting information is vague, we searched the area around Williamsfield and located a single shrub of *Rhamnus lanceolata* about 2 km E of Williamsfield just across the county line in Peoria County. This site possibly represents part of the same population collected by V. H. Chase 109 years earlier.

area. Many of these areas, particularly state parks and many natural areas, cover one or more square miles making them difficult to search.

Besides the lack of information on herbarium labels, another significant reason for the low success rate is the massive invasion of exotic plant species during the past 60 years. This invasion has resulted in the loss of habitat for many uncommon species, particularly those that are site and habitat specific. Also, success rate depends on the length of time since a particular species was first reported or collected at a site. Overall, habitat destruction over time has resulted in a decrease in abundance of many native species, especially those that were already uncommon. Also, many species react unfavorably to habitat changes. Succession likewise makes a changed site unsuitable for many native species continued existence. This is particularly true with hill prairies. These transient communities, in the absence of fire, are subjected to woody invasion. Many small hill prairies have been lost completely, having become woody thickets (McClain et al. 2009). Recent studies show a reduction of 50% to 65% in the size of many hill prairies during the 50 year period from 1936 to 1986 (McClain 1983, McClain and Anderson 1990, Robertson et al. 1996, Schwartz et al. 1997).

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