Naturalized Winged Wahoo (*Euonymus alatus*) in Illinois

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INTRODUCTION

Alien taxa account for about 20 percent of the vascular plant flora of Illinois (Henry and Scott 1980). Many of these taxa are not weedy, and are rarely encountered in natural communities. Some, however, are major plant pests, and the consequences of the introduction and widespread planting of several of these are being felt at the present time. One of these species which appears to have similar potential is winged wahoo or burning bush (*Euonymus alatus* (Thunb.) Sieb.).

This native of eastern Asia is used throughout northeastern United States as an ornamental hedge, wildlife planting, and for landscaping along interstate highways. Fernald (1950) and Gleason (1952) indicated this species will occasionally spread from cultivation and it was first reported as naturalized in a forested ravine in Coles County, Illinois (Ebinger and Phillippe 1973). Subsequently, Swink and Wilhelm (1979) reported it from DuPage County, Mohlenbrock and Ladd (1978) listed it from six counties in the state, while Ebinger (1979) reported its occurrence in Lake and Will Counties, Illinois. Later, Ebinger (1983) discussed the potential problem of this species in natural area management. The present study was undertaken to determine the extent that winged wahoo has become naturalized at various sites in central and northern Illinois.

MATERIALS AND METHODS

In each area studied, one or more ten meter square random quadrats were located within winged wahoo populations. Seedlings (less than 2.5 cm dbh.) and saplings (2.5 to 10.0 cm dbh.) of all woody species in the quadrat were identified and their numbers recorded. The seedlings were further divided into two groups, those less than 30 cm in height and those more than 30 cm in height but less than 2.5 cm dbh. From these data, the number of winged wahoo and the number of all other species combined per m^2 was determined for each area.

RESULTS AND DISCUSSION

The extent of winged wahoo established at six areas in central and northern Illinois is outlined in Table 1. The areas represent a variety of habitat types, ranging from wooded pasture to mature second growth forest. One of the winged wahoo populations occurs in a state park, and two are located in nature preserves. Each of the study areas is discussed, below:

Area 1: Waterworks ravine, one mile east of Charleston, Coles County, Illinois (NW 1/4 Sec 5 T12N R9E). The overstory in this narrow ravine is relatively mature second growth forest dominated by white oak (*Quercus alba*), red oak (*Quercus rubra*), and sugar maple (*Acer saccharum*) mostly in the 3-5 dm diameter class. Winged wahoo dominates the understory in most parts of this ravine and extends over about four hectares with some individuals 4 m tall, 6 cm in diameter, and in excess of 30 years in age. Along the creek at the ravine bottom (Table 1, Area 1A) density of winged wahoo seedlings is 138 individuals per m^2 (1,383,000 per hectare), while the wahoo saplings average 1,400 individuals per hectare. In this area wahoo seedlings are nearly 300 times more abundant than other woody species; wahoo saplings also exceed the saplings of all other woody species combined. About half-way up the north facing slope of the ravine, winged wahoo seedlings are common, averaging 11,200 individuals per hectare (Table 1, Area 1B); however, at the top of the slope, winged wahoo seedlings average 5,800 per hectare (Table 1, Area 1C). At these sites (Areas 1B, 1C), no wahoo saplings were found in the randomly located plots, but some were observed in the general area.

Table 1: Average number of individuals of seedlings and saplings per square meter of *Euonymus alatus* and all other woody species combined at six sites in central and northern Illinois.

	SEEDLINGS (less than 30 cm tall)		SEEDLINGS (More than 30 cm tall) (less than 2.5 cm dbh.)		SAPLINGS (2.5-10.0 cm dbh.)	
Area	*Euonymus alatus*	Other Species	*Euonymus alatus*	Other Species	*Euonymus alatus*	Other Species
1A	134.40	.01	3.90	.46	.14	.09
1B	.39	.97	.73	1.76	.00	.10
1C	.32	1.13	.26	1.54	.00	.13
2A	13.39	.02	13.50	.33	.05	.16
2B	.32	.03	.52	1.07	.00	.13
3	12.96	.19	.25	.23	.08	.08
4	7.38	.61	.03	1.01	.03	.09
5	35.59	.25	.14	.93	.08	.13
6	22.68	2.32	.25	1.29	.15	.02

Area 2: Fox Ridge State Park, Coles County, Illinois (NE 1/4 Sec 14 T11N R9E). The winged wahoo population extends for nearly 100 m along both sides of a stream in a narrow terrace forest. The overstory is dominated by sycamore (*Platanus occidentalis*), American elm (*Ulmus americana*), slippery elm (*U. rubra*), bitternut hickory (*Carya cordiformis*), and buckeye (*Aesculus glabra*), with most of the individuals in the 2-4 dm diameter class. One quadrat was placed along the north edge of the stream where winged wahoo is extremely common. In this area wahoo seedlings density was 26.88 individuals per m^2 (268,800 per hectare), while saplings averaged 500 per hectare (Table 1, Area 2A) and are at least 50 times more abundant than all other woody species combined. On the south side of the stream, about 20 m from the main population, winged wahoo is still fairly common. Here winged wahoo seedlings average .84 per m^2 (8,400 per hectare), but no wahoo saplings occurred in the quadrat.

Area 3: Oakland cemetery, Stephenson County, Illinois (NE 1/4 Sec 2 T26N R7E). The winged wahoo population occurs in a heavily grazed pasture to the east of the cemetery. The open overstory of the pasture is dominated by large white oaks mostly in the 6-8 dm diameter class. Scattered black walnut (*Juglans nigra*), shagbark hickory (*Carya ovata*), and bur oak (*Quercus macrocarpa*) are also present. The understory is dominated by dense stands of Tartarian honeysuckle (*Lonicera tatarica*), winged wahoo and multiflora rose (*Rosa multiflora*), which apparently spread from the extensive hedge surrounding the cemetery. The study area was located about 30 m from the cemetery in a dense stand of winged wahoo. In this area wahoo seedlings average density was 13.21 individuals per m^2 (132,000 per hectare), most being less than 30 cm tall (Table 1). Wahoo saplings average 800 indivi-duals per hectare with most of the remaining saplings being Tartarian honeysuckle.

Area 4: Black Hawk Forest Nature Preserve, Rock Island County, Illinois (NE 1/4 Sec 14 T17N R2W). The study area is in a mature, upland, dry-mesic forest dominated by white oaks in the 4-6 dm diameter class. The winged wahoo population extends over an area of about one hectare with ten large wahoo shrubs to 3 m tall occurring near the path at the center of the population. Numerous seedlings occur under and around these shrubs while scattered individuals to 1 m tall are found up to 75 m from the main group. Near the center of the population seedlings average 7.41 individuals per m^2 (74,100 per hectare), while saplings average 300 individuals per hectare (Table 1). Other populations of winged wahoo also occur in the forest, but the one sampled is the most extensive.

Area 5: Far Horizons Girl Scout Camp, two miles southeast of Hanover, Jo Daviess County, Illinois (NW 1/4 Sec 26 T26N R2E). Numerous winged wahoo are planted at the edge of the forest which surrounds the camp located in an upland clearing. The area studied is at a north-facing hillside in a second growth disturbed forest. The fairly open overstory is dominated by white oak, red oak, walnut, and slippery elm that are mostly in the 4-6 dm diameter class. In this area, winged wahoo seedlings average 35.73 individuals per m^2 (357,300 per hectare). Most of the seedlings are one and two year old plants and are less than 30 cm tall. In some parts of

the quadrat the seedlings form a dense cover and even grow on rotten logs. Large winged wahoo shrubs are also common (800 per hectare) and nearly as abundant as the saplings of other woody species (Table 1).

Area 6: Mississippi River Sand Hills Nature Preserve, Hancock County, Illinois (SE 1/4 Sec 3 T4N R9W). The winged wahoo population extends for about 75 m along an ephemeral stream in a floodplain terrace. The nearly closed overstory is dominated by sycamore, redbud (*Cercis canadensis*), osage orange (*Maclura pomifera*), bitternut hickory, and green ash (*Fraxinus pennsylvanica*) in the 1-3 dm diameter class. A few wahoo shrubs to 3 m tall are scattered throughout the lowland near the stream. In this area winged wahoo seedlings average 22.93 individuals per m^2 (229,300 per hectare), while saplings average 0.15 individuals per m^2 (1,500 per hectare), far exceeding the seedlings and saplings of other woody species.

In addition to the sites listed above, winged wahoo has been observed in northern Macoupin County (J. Schwegman, pers. comm.), at Hanover Bluff (a state-owned natural area 2 miles southwest of Hanover, Jo Daviess County, Illinois) and at Camp Benson (two miles west of Mt. Carroll, Carroll County, Illinois).

CONCLUSION

Winged wahoo is now being found as a naturalized species in many forest habitats in Illinois. Since first being reported as naturalized in Illinois in 1973, it has been found in at least 13 counties and undoubtedly occurs in many more. The most disturbing fact is that since it can grow and reproduce in dense shade, this species can invade shaded, relatively undisturbed forest communities.

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