

NOTICE OF RELEASE OF 'REDWING' AUTUMN OLIVE  
FOR CONSERVATION PLANTINGS

By

UNITED STATES DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
ECOLOGICAL SCIENCES  
Washington, D.C.

And

UNIVERSITY OF NEBRASKA - LINCOLN  
AGRICULTURAL RESEARCH DIVISION  
Lincoln, Nebraska

And

MICHIGAN DEPARTMENT OF NATURAL RESOURCES  
Lansing, Michigan

The United States Department of Agriculture, Soil-Conservation Service; University of Nebraska - Lincoln, Agricultural Research Division and the Michigan Department of Natural Resources announce the release of 'Redwing' autumn olive, Elaeagnus umbellata, Thunb.

'Redwing' was grown from open-pollinated seed collected in 1961 from a single plant in a 'Cardinal' autumn olive planting. The planting is on state land at the Rose Lake Wildlife Experiment Station, East Lansing, Michigan. This variety was evaluated under accession number Mich-777. The PI number assigned to 'Redwing' is PI 477008.

Evaluations of 'Redwing' at the Rose Lake Plant Materials Center (PMC) and in a wide range of field plantings indicate that it has excellent to good performance in Plant Hardiness Zones 5, 6 and 7. This represents a large belt from the eastern states through the midwest and a narrow band in the Pacific northwest. In field plantings, performance varies, but plant hardiness extends further north into zone 4b in portions of Michigan, Wisconsin and Minnesota than does 'Cardinal' or 'Elsberry' autumn olive. 'Redwing' has

proven to be adapted in Plant Hardiness Zone 5a in Nebraska. While winter damage has occurred there, it is not severe. It is the best variety that has been evaluated by the University of Nebraska - Lincoln for cold hardiness, vigor and fruit production.

'Redwing' was selected from its parent variety, 'Cardinal', for its early maturing, larger and definitely sweeter fruit. The fruit matures as many as 20 days earlier than other varieties. It also has larger, darker green leaves than either 'Cardinal' or 'Elsberry' autumn olive. In a 1971 planting at Rose Lake PMC, 84 percent of the plants exhibited these characteristics. 'Redwing' produces pale yellow flowers from mid-May to early June. The fruit is retained until late winter. This variety grows well on coarse textured, well drained soils. Poor plant survival and growth rate have been recorded for plantings made on poorly drained, fine textured soils. 'Redwing' attains a height and crown width of 10 to 15 feet.

'Redwing' is ideal for screen or border plantings and wildlife food and cover. It may also be used in farmstead windbreaks or shelterbelts. Songbirds, in particular, are attracted to the fruit from ripening time in September until late winter.

'Redwing' is released as an open-pollinated seed propagated cultivar. Propagation by commercial nurseries will be from open-pollinated seed. A seed orchard is established at the ~~TJSDA~~ Soil Conservation Service Rose Lake Plant Materials Center, East Lansing, Michigan. This seed orchard will be maintained as a breeders' block for foundation seed production for distribution to public and commercial nurserymen.



University of  
Nebraska  
Lincoln

Institute of Agriculture and Natural Resources

Department of Forestry, Fisheries and Wildlife  
101 Plant Industry  
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DATE: February 5, 1985

TO: Irvin T. Omtvedt, Director  
Agricultural Research Division

FROM: G. L. Hergenrader, Head and State Forester  
Department of Forestry, Fisheries, & Wildlife

RE: Release of Elaeagnus umbellata 'Redwing'

I recommend that the cultivar 'Redwing' a selection from 'Cardinal' autumn olive grown at the Rose Lake Wildlife Experiment Station, East Lansing, Michigan, be released to commercial nurseries. The data have been reviewed by the Woody Plants Release Committee.

4 Feb 1985 G. L. Hergenrader  
Date Head, Department of Forestry, Fisheries & Wildlife

2/6/85 Don LeLorge  
Date Head, Department of Horticulture

2/8/85 [Signature]  
Date Head, Department of Entomology

2/6/85 [Signature]  
Date Head, Department of Plant Pathology

2/20/85 David F. VanHaven  
Date U. S. Forest Service

2/27/85 Walt Bagley

Thomas W. Sheffert

Director, Ecological Sciences, Soil Conservation Service  
United States Department of Agriculture  
Washington, D.C.

4/4/85

Date

James R. Helms

State Conservationist, Soil Conservation Service  
United States Department of Agriculture  
East Lansing, Michigan

11/14/84

Date

Sheldon L. Lemmi

State-Conservationist, Soil Conservation Service  
United States Department of Agriculture  
Lincoln, Nebraska

3/5/85

Date

Levin T. Ostrebeck

Dean and Director, University of Nebraska - Lincoln  
Agricultural Research Division  
Lincoln, Nebraska

2/27/85

Date

Ronald O. Serry

Director, Michigan Department of Natural Resources  
Lansing, Michigan

20 hurf4

Date

DATA TO SUPPORT RELEASE OF REDWING AUTUMN OLIVE

Cultivar: Redwing

Accession No.: Mich-777, 4976T, PI 477008

Common Name: Autumn olive

Scientific Name: Elaeagnus umbellata, Thunb.      Symbol: ELUM

Description: Redwing autumn olive is a shrub 10-15 feet (305-457 cm) in height and width. Branches yellowish brown, often partly silvery. Leaves elliptic to ovate-oblong, obtuse to short-acuminate, rounded to broad-cunate at base, often with crisped margin, usually with silvery scales above when young, sometimes glabrous, silvery beneath and usually mixed with brown scales. Redwing's leaves are larger and darker green than other varieties. Redwing blooms in mid-May to early June, its flowers are pale yellow, fragrant and scaly outside. The large red fruit matures as many as 20 days earlier than either Cardinal or Elsberry autumn olive. The fruit is definitely sweeter than those of Cardinal.

Origin: Autumn olive is a plant introduction from Manchuria. Cardinal is an improved cultivar released in 1961 by the Soil Conservation Service, Big Flats Plant Materials Center, New York. Redwing seed, tested as Mich-777 and 4976T, was collected in 1961 from a single plant in a Cardinal autumn olive planting. This planting is on state land at the Rose Lake Wildlife Research Station, East Lansing, Michigan. It was selected for testing because of its apparent early maturing, larger and sweeter fruit than Cardinal. It also has darker green leaves. Seedlings for initial and advanced evaluations and field plantings have been grown from open-pollinated seed collected from the original individual plant.

Uses: Redwing is ideal for screen or border plantings and wildlife food and cover. It may also be used in farmstead windbreaks or shelterbelts. Songbirds in particular, are attracted to the fruit from ripening time in early September until late winter.

Performance: The first comparative planting (Project 5-63) was made at the Rose Lake Plant Materials Center (PMC) in April 1963. Twelve accessions of autumn olive were included in the project. By 1966 some comparative evaluations could be made and some conclusions drawn. Indications were that Redwing had 96% survival, strong vigor, early maturing fruit, that was persistent, and that all 24 plants produced fruit in 1966. By contrast Cardinal had fewer fruit, fair vigor, and thin foliage. It was stated in the remarks that Cardinal was not comparable in performance to Redwing. (See Table 1, taken from Rose Lake PMC Annual Technical Report (ATR) 1966). By 1977, Redwing had reached an average height of 16 ft. (488 cm) and an average spread of 20 ft. (609 cm). It could be easily identified by the larger, sweeter fruit and dark green, dense foliage.

A second comparative planting (Project 24-71) was made in 1971 at the Rose Lake PMC using Cardinal as a standard. Elsberry autumn olive was the third accession included in the project. In 1979 Cardinal had severe winter kill and very little fruit production; Elsberry had severe winter kill and medium fruit production; while Redwing had very little winter kill and medium fruit production. It produced larger and sweeter fruit than Cardinal and was comparable to Elsberry

in that respect. At the Rose Lake PMC, in the 1971 planting, 84% of the plants exhibited the typical characteristics of the parent plant. (See Table 2, taken from the Rose Lake PMC, ATR, 1979).

A third comparative planting (Project 36-73) was made in 1973. Five plants of each accession were used. Cardinal and Elsberry were rooted cuttings and Redwing was 2-0 seedlings. Redwing had 100% survival and very little winter damage. (See Table 3 taken from Rose Lake PMC, ATR, 1978).

Redwing seedlings became available for field plantings in 1962. These seedlings were produced from seed collected from an open-pollinated single plant. Many of the early seedlings produced were distributed to Michigan, Indiana, Wisconsin, Kansas, Nebraska, Minnesota and Iowa. By 1975 Redwing autumn olive, using Cardinal as a standard of comparison, was being extensively evaluated throughout Michigan and Wisconsin. Many plantings also included Elsberry autumn olive. (Tables 4 and 5 indicate the performance ratings for these field plantings.) In addition, older field plantings that had been terminated were selected for re-evaluation in certain Major Land Resource Areas (MLRA) of Michigan and Wisconsin. The MLRA's were selected on the basis of being areas of questionable performance of autumn olive. Again, data received indicates that while both Redwing and Cardinal may be surviving, over all performance is poor in MLRA's with severe winter conditions. Indications are however that Redwing is a little more winter hardy than Cardinal but not significantly enough to warrant extending the range of adaptation in Michigan and Wisconsin. It also indicates that all cultivars of autumn olive are not winter hardy in inland counties of Northern Michigan and Wisconsin.

All of the Redwing plantings in Minnesota above plant hardiness zone 4b were considered failures. The plants have survived but sustained severe winter kill each year and never produced enough mature wood for flower and fruit production.

Plantings of Redwing in Alaska and Arizona all were failures. Near Bismarck, North Dakota a planting had 80% survival, however, after five years the height range was only 3 to 4 ft. (91-122 cm). This indicates severe winter kill each year. At Corvallis, Oregon a comparative planting indicates that Redwing is adapted there and all accessions were rated, in 1976, as having excellent vigor. Redwing has been evaluated at Cape May Plant Materials Center since 1966. All ratings were equal to Cardinal with Redwing having earlier maturing fruit. Only two plantings of Redwing in Iowa were in the areas where severe damage occurs to Cardinal and Elsberry, so comparison is not reliable. In other Iowa plantings, Redwing's performance was comparable to Cardinal.

In Illinois, Indiana and Missouri all plantings of Redwing were rated good to excellent.

In Kansas, except for the northeast corner, near the Missouri, Nebraska border plantings of Redwing were failures or performed poorly. (See Table 6, Evaluation Summaries for Kansas, 1971 - 1978 and 1983.)

In Nebraska, Redwing has performed well. Stand, vigor, production and effectiveness were rated from good to excellent with few exceptions. (See Table 7, Evaluation Summaries for Nebraska, 1971 - 1978 and 1983.) Limited plantings of Redwing autumn olive in Oklahoma were good in the eastern one-fifth of the state.

Adaptation: The primary range of adaptation for Redwing will be considered the same as for Cardinal autumn olive except it has been extended into Nebraska in portions of plant hardiness zones 4b, 5a and 5b. Redwing is also adapted to zone 7a, the Willamette Valley area of Oregon. While Redwing is less susceptible to winter kill than Cardinal, this does not significantly extend the range of adaptation for autumn olive.



Redwing autumn olive area of adaptation

Soils: Redwing autumn olive grows well on coarse textured, well drained soils. Poor plant survival and growth rate have been recorded for plantings made on poorly drained, fine textured soils.

Propagation: Redwing autumn olive is a seed propagated cultivar. Seedlings are easily grown by sowing untreated seed in the fall. Procedures for fruit collection, extraction and storage of seed and nursery practices are identical to those of other autumn olive cultivars. This information can be found in USDA Leaflet No. 458, Autumn Olive for Wildlife and Other Conservation Uses and Seeds of Woody Plants in the United States, USDA Agriculture Handbook No. 450.

Method of Establishment: Redwing autumn olive requires well drained soils for satisfactory growth. Successful establishment has been obtained using 2-0 planting stock by following the normal planting procedures for bare root trees and shrubs. Weed, grass and rodent control is necessary for good establishment and uniform growth. This can be obtained through cultivation, mowing and application of approved herbicides after establishment year. Approved rodenticide may also be used. Spacing for hedgerow planting is 4-6 feet (122-183 cm) and 8-10 feet (244-305 cm) between rows. In clump plantings the maximum spacing is 8x10 feet (244-305 cm).

Disease, Insect and Rodent Damage: No serious diseases or insect damages have been observed to limit Redwing's growth. Girdling by mice during winter months has caused serious damage to all cultivars of autumn olive. Deer browse damage is also evident in some plantings.

Sources of Seed and Planting Stock: The USDA, Soil Conservation Service, Rose Lake Plant Materials Center, 7472 Stoll Road, East Lansing, Michigan 48823 will maintain breeder seed and foundation stock of Redwing autumn olive. Breeders seed and foundation stock will be made available for distribution to public and commercial nurserymen.

References:

Bonner, F. T. 1974. Seeds of woody plants of the United States, Elaeagnus L. USDA, Forest Service Handbook 450: 376-379.

USDA, Soil Conservation Service. 1965. Autumn Olive for Wildlife and Other Conservation Uses. Leaflet No. 458, 8 p.

Prepared by: The data to support the release of Redwing autumn olive was assembled by Dorian A. Carroll, Plant Materials Specialist and Ellis G. Humphrey, Plant Materials Center Manager, USDA, Soil Conservation Service, East Lansing, Michigan, October 1984.

TABLE 1  
Rose Lake PMC

5-63 Autumn olive

Twelve accessions of autumn olive, Elaeagnus umbellata, were established in the spring of 1963. Three accessions were added in 1965 and one was added ~~in 1966~~. Evaluations are being made for survival, winter hardiness, age of fruiting and time of fruiting. These accessions will be evaluated for quality and quantity and persistence of fruit and availability during critical periods for wildlife.

1966 observations on accession in study are as follows:

<u>Acc. &amp; Source</u>	<u>Species</u>	<u>Age of Planting Stock &amp; Year Planted</u>	<u>No. Pl.</u>	<u>No. Surviving</u>	<u>Percent Survival</u>	<u>No. Bearing Fruit</u>	<u>Fruit Maturity</u>	<u>No. Plants with Fruit Persisting 11-10-66</u>	<u>Remarks</u>
Mich-988 NY-3082	<u>E. umbellata</u>	66	5	4	80	0			
Mich-678 Mort. Arbor.	" "	63	5	5	100	5	Early & Late	3+	Ave. 6' high, vigor of all plants strong.
Mich-851 BN-12090	" "	63	9	9	100	9	Med.	9	Ave. ht. 5', vigor fair.
Mich-849 BN-11385	" "	63	10	4	40	2	Late	2	Ave. ht. 3½', vigor lacking.
Mich-988 NY-3082	" "	65	2	2	100	0			1-2' ht., vigor fair.
Mich-986 BN-13459	" "	65	15	15	100	2	Med.	2	Ave. ht. 2½'
Mich-847 BN-11374	" "	63	25	22	88	21	Early to Late	17	Light fruit crop on many plants. Ave. ht. 4', vigor fair. Only 2 plants with good fruit crop persisting on 11-10-66.
Mich-848 BN-11373	" "	63	25	23	92	23	Med.	22	Considerable variation in yield of fruit per plant. Ave. ht. 5', 6 plants have exceptional fruit persistence.

TABLE 1 - continued  
Rose Lake PMC

Acc. & Source	Species	Age of Planting Stock & Year Planted	No. Pl.	No. Surviving.	Percent Survival	No. Bearing Fruit	Fruit Maturity	No. Plants with Fruit Persisting 11-10-66	Remarks
Mich-777 Mich-421	E. umbellata	63	25	24	96	24	Early	24	Vigor strong, ave. ht. 5½' Some plants very heavy fruit prod. Also some fruit large sweet tasting like female parent. 12 plants have excellent fruit persistence.
Mich-682 Mort. Arbor. 194-40	" "	63	25	24	96	21	Very late	16	No fruit mature, vigor strong. Ave. ht. 5½'. 4 plants have excellent persistence. On many plants the fruit did not mature.
Mich-679 Mort. Arbor. 1272-25	" "	63	25	24	96	24	Ned. to Late	24	6 plants had mature fruit others range from partially mature to very late maturing, fruit yield good, dense foliage, ave. ht. 6'. 15 plants have good fruit persistence. Looks real promising.
Mich-421 Cardinal	" "	63	25	22	88	22	Ned.	18	Nearly all plants had mature fruit or approaching it. Yield of fruit fair, vigor fair, foliage thin. Available fruit on 11-10-66 few to fair. Not comparable to Mich-777 or 679.
Mich-856 Mich-421	" "	63	14	12	86	11	Med. to Late	11	Some plants late maturing Appearance of Cardinal. Fr. yield good. Fair crop of fruit persisting on all plants which produced fruit.
Mich-987 BN-13460	" "	65	12	12	100	2	Med.		Ht. 2', vigor strong. 2 plants had a few fruit.

TABLE 2

PROJECT 24-71 COMPARATIVE EVALUATION OF THREE ACCESSIONS  
OF HLAEAGNUS UMBELLATA, AUTUMN OLIVE, 1979

## Rose Lake PMC

Acc.#	Species	Source	Yr. Ptd.	% Sur.	V	Ht.*	Den.	Sp.*	Cov.	Fruiting Habits			Injury			Remarks	
										Bl	Mt.Amt.	Ret.	WI	II	DI		
Mich-421 'Cardinal'	<u>HLAEAGNUS</u> umbellata	Rose Lake MI	71	99	G	4.0	M	3.7		6/8	8/31	F	10/31	S	N	N	Severe winter kill
Mich-777	"	Rose Lake PMC.	71	73	E	4.0	H	4.0		6/8	8/31	M		L	N	N	Healthy stand, very little winter kill
M-6369	r	Elsberry	71	80	G	4.2	M	3.9		5/21	8/31	<b>M</b>		S	N	N	Severe winter kill, abundant fruit pro- duction & excellent retention

\*Measurement in meters

TABLE 3

PROJECT 36 73 THE COMPARATIVE EVALUATION OF THREE CESSIONS  
OF AUTUMN OLIVE, ELAEAGNUS UMBELLATA, 1978

Rose Lake PMC

Acc.#	Species	Source	Yr. Ptd.	% Sur.	V	Ht.*	Den.	Sp.*	Cov.	Fruiting Habits			Injury			Remarks	
										Bl	Mt.Amt	Ret.	WI	II	DI		
	ELAEAGNUS																
Mich-421 'Cardinal'	umbellata	Rose Lake MI	73	40	F	2.4	M	2.4		6/8	9/20	M	12/18	M	N	N	Some winter damage
Mich-777	"	Rose Lake PMC	73	100	E	1.6	M	1.6		6/8	9/24	F		L	N	N	Very little winter kill
MI-6369	"	Elsberry	73	80	G	1.6	M	1.6				F		L	N	N	

\*Measurement in meters

TABLE 4

FIELD PLANTINGS IN WISCONSIN  
INVOLVING  
'CARDINAL', 04976 T AND 'ELSBERRY' AUTUMN OLIVE

CO./coop.	Date Planted	Accession	IRA's	Soils	Rating/year											
					70	71	72	73	74	75	76	77	78	79		
Pierce	5-20-64	Cardinal	105	-	3											
Henry Denzer		04976 T			3											
Monroe	4-24-71	Cardinal	105	Boone fs & lfs	2	5										
Craig Carlson		04976 T		Hixton fsl	2	5										
		Elsberry			2	5										
Pierce	4-29-71	Cardinal	105	Otterholt sil	1	1	2	2	3	3						
Ellsworth School		04976 T		& Seaton sil	3	1	1	1	1	1						
District' City School																
Langlade	5-71	Cardinal	90	Kennen	2	3										
Wilber Petroskey		04976 T			3	3										
		Elsberry			2	2										
Grant	5-71	Cardinal	105	Fayette	2	2	2	1	2							
Dominican Outdoor		04976 T			1	2	1	1	1							
Ed. Center		Elsberry			1	2	2	2	1							
Manitowac	5-1-71	Cardinal	95	Casco sl &	2	2										
Karl Wernecke		04976 T		Lunds 1	2	2										

TABLE 4 - continued

Wisconsin

Co./Coop.	Date Planted	Accession	LRA's	Soils	Rating/year									
					70	71	72	73	74	75	76	77	78	79
Pierce Ellsworth School Dist. Lindgren School	5-3-71	Cardinal 04976 T	105	Seaton sil	1 2	1 1	1 1	2 2	1 1	4 2				
Oconto Lena High School Outdoor Ed. Center	5-3-73	Cardinal 04976 T Elsberry	93	Onaway 1	2 2 2	1 2 2	2 2 2	2 1 3	3 2 3					
Grant U. of Wis. Lancaster Exp. Sta.	5-3-71	Cardinal 04976 T Elsberry	105	Dubuque	3 1 1	1 1 2	- - -	2 1 1	2 1 1					
Kewaunee Tom Konop	5-10-71	Cardinal 04976 T Elsberry	95	Kewaunee sil			2 2 2	2 2 2	2 2 2	1 2 1				
Jefferson Olin Sang Union Inst.	Spring 72	Cardinal 04976 T	95	Casco sil, 1 & sl			3 3							
Pierce Louis C. Barber	5-3-72	Cardinal 04976 T	105	Port Byron sil			2 2							
Jefferaon Waterloo Wildlife Area	5-5-72 .	Cardinal 04976 T	95	not listed				2 2	2 2	1 1	1 1			
Washington Ridge Run Park	5-11-72	Cardinal 04976 T	95	Hebron, Casco			1 1	1 1	1 1	1 1	3 2	3 1	3 1	3 1

TABLE 4 - continued

## Wisconsin

Co./Coop.	Date Planted	Accession	IRA's	Soils	Rating/year										
					70	71	72	73	74	75	76	77	78	79	
Taylor Elmer Hedlund	4-21-73	Cardinal 04976 T	90	Freer s1 Amery 1				2	2	3					
Grant U. of Wis. Lancaster Exp. Sta.	4-27-73	Cardinal 04976 T	105	Morocco						1					
Waushara Moravian Church Camp	5-6-73	Cardinal 04976 T	91K	Plainfield ls Richford ls Oshtemo ls				1	1	2	2				
Buffalo Robert Rinehart	4-20-74	Cardinal 04976 T	105	Rowley s1					2	2	1				
Buffalo Jay & Maryann Reed	4-22-74	Cardinal 04976 T	105	Boone fs				2	2	2					
Door Sevastopol School District	4-26-74	Cardinal 04976 T	95	Onaway & Solona				2	2	2					
Clark K.J. Chase	5-74	Cardinal 04976 T	90	Silt loam & sandy 1				2	2						
Taylor Isadore Bode	5-1-74	Cardinal 04976 T	90	Antigo s1				1	2	2	2	2	2	2	2
								1	1	1	1	1	1	1	1

TABLE 4  
Wisconsin

CO./coop.	Date Planted	Accession	LRA's	Soils	Rating/year									
					70	71	72	73	74	75	76	77	78	79
Washington Farmington Twp. Landfill	4-23-75	Cardinal 04976 T	95	Casco-Rodman							1	3	2	3
											1	3	2	3
St. Croix Orvil Lafferty	4-26-75	Cardinal 04976 T	90	Onamia-Chetek							2	2	2	2
											2	2	3	3
LaCrosse Owen Johnson	5-76	Cardinal 04976 T	105	Fayette sil							2	1	1	1
											2	1	1	1

Rating: 1 = Excellent; 2 = Good; 3 = Fair;  
4 = Poor; 5 = Failure

TABLE 5

FIELD PLANTINGS IN MICHIGAN  
INVOLVING  
'CARDINAL', 04976 T AND 'ELSBERRY' AUTUMN OLIVE

co./coop.	Date Planted	Accession	LRA's	Soils	Rating/year										
					70	71	72	73	74	75	76	77	78	79	
Antrim E. L. Wright	4-68	Cardinal 04976 T	94-S	not listed	2	3	-	-	3						
					2	2	-	-	2						
Iosco National Gypsum	4-9-68	Cardinal 04976 T	94-S	Spoil	1	1	1	1	1	1					
					1	1	1	1	1	1					
Chippewa Janet Roberts	4-29-69	Cardinal 04976 T	94-N	Blue Lake Onaway	2	3	2	-	-	-					
					2	3	2	-	-	-					
St. Clair Co. Road Comm	5-6-69	Cardinal 04976 T	99	Sanitary Land Fill (Fly ash)	1	2	-	-	-	-					
					1	2	-	-	-						
Manistee Lee Ashcraft	5-5-70	Cardinal 04976 T	96	Spoil bank Brevort Kakawlin Kinross	2	1	1	-	-	-					
					2	1	1	-	-						
Delta P.L. Bradfield	4-24-71	Cardinal 04976 T Elsberry	93	Trenary fsl Onaway fsl		1	1	1	2	2	2				
						1	1	1	2	1	2				
						1	2	2	2	3	3				
Kalkaska Robert Guiffra	4-28-71	Cardinal 04976 T Elsberry	94-S	Kalkaska ls			1	-	-	-					
							1	-	-	-					
							1	-	-	-					

TABLE 5 - continued  
Michigan

co./coop.	Date Planted	Accession	LRA's	Soils	Rating/year										
					70	71	72	73	74	75	76	77	78	79	
Kalkaska Don Longfield	4-28- 1	Cardinal 04976 T Elsberry	94-S	Kalkaska s			1	-	-						
							2	-	-						
							3	-	-						
Kalkaska High School	5-4-7	Cardinal 04976 T Elsberry	94-S	Kalkaska s			1	1	1	1	2				
							1	1	2	2	3				
							3	4	3	3	3				
Kalkaska Leigh Kerbyson	5-4-71	Cardinal 04976 T Elsberry	94-S	Kalkaska ls			I	2	2	2	2				
							I	2	2	2	2				
							I	2	2	2	2				
Kalkaska Stanley Rozwood	5-4-71	Cardinal 04976 T Elsberry	94-S	Kalkaska sl			3								
							3								
							5								
Kalkaska Boardman School	5-6-71	Cardinal 04976 T Elsberry	94-S	not listed			2	-	-	-					
							-	-	-	-					
							2	-	-	-					
Charlevoix E. Jordan Iron Works	5-25-71	Cardinal 04976 T Elsberry	94-S	Made land			I	1	1	I					
				Roscommon s			I	1	1	1					
				Eastport s			1	1	1	1					
				Au Gres s			1	1	1	1					
Washtenau W.H. Tite	4-72	Cardinal 04976 T Elsberry	98	Oshtemo sl			1	1	1	2	2	2			
							1	I	1	1	1	1			
							2	3	4	4	4	4			

TABLE 5 - continued  
Michigan

Co./Coop.	Date Planted	Accession	IRA's	Soils	Rating/Year										
					70	71	72	73	74	75	76	77	78	79	
St. Clair Co. Road Comm.	4-14-72	Cardinal	99	Sanitary Land Fill (Fly ash)				3	3						
		04976 T						4	3						
		Elsberry						3	3						
Clare W. Matulis	4-29-72	Cardinal	94-S	Montcalm ls				3	3	1					
		04976 T						3	2	1					
		Elsberry						3	2	2					
Alger Leslie Laakso	5/72	Cardinal	93	Summerville				2	2	2	2	3			
		04976 T						3	3	3	3	3			
		Elsberry						3	3	3	3	3			
Montcalm J. Quisenberry	5-5-72	Cardinal	98	Grayling s				2	2	2					
		04976 T						2	2	2					
		Elsberry						2	2	2					
Huron Baur Farms	4-17-73	Cardinal	99	1 and s1					1	2	2				
		04976 T							1	2	2				
Leelanau G. Eggert	5-3-73	Cardinal	96	Emmet & Leelanau					3	3					
		04976 T							3	3					
Mason-Lake Kinne Creek Club	4-20-74	Cardinal	92	Graycalm					-	3					
		04976 T							-	3					
Monroe W. Lennard	5-1-74	Cardinal	99	Granley ls				2	2	1	1				
		04976 T						1	1	1	1				

TABLE 5 - continued  
Michigan

Co./Coop.	Date Planted	Accession	LRA's	Soils	Rating/year										
					70	71	72	73	74	75	76	77	78	79	
Monroe E. Backus	5-2-74	Cardinal 04976 T	99	Oakville fs					1	1	1	1	1	1	
									1	1	1	1	1	1	
Saginaw People's Garbage	4-30-75	Cardinal 04976 T	99	Fill site (Clay & Fly ash)						3	2				
										3	2				
Manistee Northern Michigan Electric Co.	5-75	Cardinal 04976 T	96	Iosco sl							2				
											2				
Delta P.L. Bradfield	5-4-75	Cardinal 04976 T	92	Onaway fs1 Trenary fs1							3				
											3				
Monroe I.B. Spice	4-14-76	Cardinal 04976 T	98	Excavated Sands									2		
													2		
Delta WACO Hunting Club	5-17-76	Cardinal 04976 T	93	Kalkaska s									2		
													2		
Livingston J. Fergus	5-1-77	Cardinal 04976 T	98	Miami									Only 6 plants survived, terminated		
Delta J.L. Johnson	5-2-77	Cardinal 04976 T	93	Melita s									1	2	2
													2	1	1

TABLE 5 - continued  
Michigan

co./coop.	Date Planted	Accession	LRA's	Soils	Rating/year									
					70	71	72	73	74	75	76	77	78	79
Houghton- Keweenaw L. Ollila	5-6-77	Cardinal 04976 T	93	Munising sl								2	2	4
												2	2	4
Alger City of Munising	5-10-77	Cardinal 04976 T	94-N	not listed										Plants destroyed
Lenawee Rollin Twp.	4-15-78	Cardinal 04976	111	Fill material									3	3
													3	3
Manistee Tippy Dam	4-18-78	Cardinal 04976 T	96	Montcalm ls										3
														3
Manistee Lutheran Camp	4-18-78	Cardinal 04976	96	Kalkaska										3
														3
Newaygo L. Rushmore	4-20-79	Cardinal 04976 T	94-S	Montcalm-Nester										4
														4

Rating: 1 = Excellent; 2 = Good; 3 = Fair;  
4 = Poor; 5 = Failure

TABLE 6

## EVALUATION SUMMARIES REDWING FIELD PLANTINGS

Kansas

Field Office	MLRA	County	Date Planted	Purpose	Soil	Evaluation
Burlington	112	Coffey	4-74	Wildlife & Beautification	--	Stand-failure; vigor-fair; dry weather; lack of water. ('76)
Burlington	112	Coffey	4-72	Wildlife	Woodson sil	Failure; spring storm of 1972. ('73)
Coldwater	78	Comanche	4-71	Beautification	--	Failure; improper care. ('73)
Coldwater	78	Comanche	4-71	Beautification	--	Failure; improper care. ('73)
Coldwater	78	Comanche	4-71	Beautification	--	Failure; accidently destroyed. ('73)
Coldwater	78	Comanche	4-71	Beautification	--	Failure. ('73)
Coldwater	78	Comanche	4-71	Beautification	--	Failure; poor soil conditions. ('73)
Council Grove	76	Morris	4-74	Wildlife	Tully sil	Stand-poor; vigor-good; needs more soil moisture. ('75)
Council Grove	76	Morris	3-73	Beautification	--	Stand, vigor, production, & effectiveness-excellent. ('75) Failed ('83)
Girard	112	Crawford	3-74	Surface mine	--	Stand, vigor, production, & effectiveness-poor. ('76)
Girard	112	Crawford	4-76	Wildlife	--	No performance reported.
Girard	112	Crawford	6-74	Wildlife & Beautification	--	46% survival; drought. ('74)
Howard	76	Elk	4-76	Beautification & Education	--	No performance reported.
Marion	75	Marion	4-75	Wildlife	--	76 live, 24 dead; stand-excellent, vigor & effectiveness-good. ('77)

TABLE 6 - continued

Field Office	MLRA	County	Date Planted	Kansas Purpose	Soil	Evaluation
Marysville	106	Marshall	4-76	Wildlife	--	Failure; no cultivation. ('77)
Olathe	112	Johnson	4-71	Wildlife	--	Stand-good; vigor-fair. ('73)
Olathe	112	Johnson	4-72	Wildlife	--	Stand, vigor-fair. ('73)
Olathe	112	Johnson	4-72	Wildlife	--	Stand-good; vigor-fair. ('73)
Olathe	112	Johnson	4-72	Wildlife	Martin	Stand, vigor-poor; dry summer ('73)
Olathe	112	Johnson	4-72	Wildlife	--	Stand, vigor-poor; area was pastured; cattle still in area. ('73)
Olathe	112	Johnson	4-72	Wildlife	--	Stand-good; vigor-poor; dry weather. ('73)
Oskaloosa	106	Jefferson	4-77	Evaluation, Education, Beautification	Vinland	Stand, vigor-good. ('77)
Pratt	79	Pratt	3-77	Wildlife Beautification	--	Stand, vigor-good. ('77)
Pratt	79	Pratt	4-77	Wildlife Beautification	Carwile fsl	Stand, vigor-good. ('77)
Syracuse	72	Hamilton	4-77	Wildlife	Ulysses	Failure; no water during summer. ('77)
Syracuse	72	Hamilton	5-77	Beautification	Colby	Failure; hot dry winds. ('77)
Topeka	112	Shawnee	4-74	Wildlife	--	Stand-poor; vigor-fair. ('76)
Topeka	112	Shawnee	4-71	Wildlife	Martin siol	Stand-poor; vigor, production, & effectiveness-poor; dry weather; lack of management 1971 planting. ('77)
Topeka	112	Shawnee	4-71	Wildlife	--	Failure; dry weather; no management. ('77)
Topeka	112	Shawnee	4-76	Wildlife	Martin siol	Failure; dry weather; lack of management. ('77)
Washington	74	Washington	4-73	Wildlife	Eudoia-sarpy complex LFS	Stand-fair; vigor-fair. ('83)

TABLE 7

## EVALUATION SUMMARIES REDWING FIELD PLANTINGS

Nebraska

Field Office	MLRA	county	Date Planted	Purpose	Soil	Evaluation
Ainsworth	65	Brown, Keya Paha, Rock	4-77	Wildlife & Beautification	Neil fsl	Stand, vigor, production & effectiveness-excellent. ('78)
Auburn	106	Nemaha	4-77	Wildlife	—	Stand-fair; vigor-excellent ('83)
Beatrice	75	Gage	4-74	Wildlife	Adair-Pawnee	Stand, vigor-fair. ('75)
Beatrice	75	Gage	4-77	Wildlife	Judson	Stand, vigor-excellent ('83)
Blair	107	Washington	4-71	Wildlife	Haynie sil	Large fruited. ('73)
Blair	107	Washington	5-72	Wildlife	Haynie sil	Large fruited. ('73)
Burwell	65	Garfield, Blaine, Loup	4-76	Wildlife	Sarpy lfs	Stand, vigor, production & effectiveness-failure; lack of fertility and drought. ('77)
Burwell	71	Loup	3-77	Wildlife & Evaluation	Anselmo-Hersh fsl	Stand-excellent; vigor-good. ('77)
Clay Center	75	Clay	2-77	Wildlife	Hastings	Stand-excellent; spring recovery-excellent. ('83)
Geneva	75	Fillmore	5-73	Beautification	Hastings sil	Stand, vigor, production, & effectiveness-failure; believed due to livestock. ('75)
Grand Island	71	Hall	1974	Wildlife	—	Stand, vigor-poor. ('76)
Harrisburg	67	Banner	5-75	Windbreak	Bayard fsl	Stand, vigor, production, & effectiveness-good. ('75)
Harrisburg	67	Banner	4-77	Evaluation	Dwyer-Valent fs	Stand, vigor, production, & effectiveness-failure. ('77)
Harrisburg	67	Banner	4-76	Evaluation & Windbreak	Bayard 1, Dwyer-Valent lfs	Stand-good; vigor & production-fair ('76)
Holdrege	75	Phelps	4-77	Wildlife	—	Stand-good; 15 plants; 13 alive. ('77)
Imperial	72	Chase	4-77	Evaluation	Ditton fsl	Stand, vigor-good; effectiveness-excellent. ('77)

TABLE 7 - continued

Field Office	MLRA	county	Date Planted	Purpose Nebraska	Soil	Evaluation
Madison	102	Madison	4-76	Wildlife	Thurman lfs	Stand-poor; vigor-fair. ('77)
Nelson	75	Nuckolls	5-76	Evaluation	Hastings sil	Stand, vigor, production, & effectiveness-excellent. ('76)
Nelson	75	Nuckolls	4-74	Wildlife	Hastings sil	Stand-good; vigor, production, & effectiveness-excellent. ('76) Stand-good; vigor-good. ('83)
Nelson	75	Nuckolls	5-75	Wildlife	Holder sil	Failure. ('76)
Pawnee City	106	Pawnee	4-73	Evaluation	--	Stand, vigor-excellent; healthy and vigorous. ('73)
Pawnee City	106	Pawnee	4-73	Evaluation	--	Stand, vigor, effectiveness-excellent; production-good. ('73)
Red Cloud	73	Webster	4-77	Evaluation	Holdrege sil	Stand, vigor, production-excellent. ('77) Same as '77. ('83)
St. Paul	71	Howard	4-74	Wildlife & Windbreak	Uly sil	Stand, vigor, effectiveness-failure; drought and no moisture probable cause. ('74)
Syracuse	106	Otoe	4-71	Wildlife	--	Growth rate - 3' - 5' ('75)
Syracuse	106	Otoe	4-71	Wildlife	Sharpsburg	Growth rate - 1' - 3' ('72) Simazine control-fair.
Syracuse	106	Otoe	4-71	Wildlife & Wave Action Control	--	Growth rate - 1' - 3' ('72) Simazine control carried over.
Syracuse	106	Otoe	4-71	Wildlife	Sharpsburg	Growth rate - 3' - 6' ('72) Simazine control-fair.
Syracuse	106	Otoe	4-71	Wildlife	Steinauer	NO performance reported.
Syracuse	106	Otoe	5-73	Wildlife	Sharpsburg & Pawnee	Vigor-good. ('74)
Syracuse	106	Otoe	5-73	Wildlife	Sharpsburg	Failure; drought & hot weather. ('74)
Syracuse	106	Otoe	5-73	Wildlife	--	Vigor, production, effectiveness-fair. ('74)
wahoo	106	Saunders	5-75	Wildlife & Beautification	--	Stand, vigor-good; production, effectiveness-fair. ('76)
wahoo	106	Saunders	5-75	Wildlife & Erosion Control	Sharpsburg	Stand-good; vigor, production-fair; effectiveness-poor. ('76)