

REQUEST FOR THE RELEASE OF ROUGH  
OXEYE CULTIVAR 'MIDAS' PI-421379

S. S. Salac, P. N. Jensen, J. W. Walstrom, and R. S. Dayton

DEPARTMENT OF HORTICULTURE  
INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES  
UNIVERSITY OF NEBRASKA, LINCOLN

and

DEPARTMENT OF HORTICULTURE  
KANSAS STATE UNIVERSITY  
MANHATTAN, KANSAS

and

UNITED STATES DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

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I. Suggested Name: 'Midas' rough oxeye

II. Species Description: Rough oxeye, Heliopsis helianthoides (L.) Sweet var. scabra, (Dunal.) Fern, is an erect perennial .4-2 m tall arising from a short rhizome, leaf blades ovate or triangular to lanceolate 4-14 cm long and 1.5-8 cm wide, the apex acute, the margins coarsely serrate, both surfaces covered with rough, siliceous-based hairs or sometimes only slightly rough. Heads mostly 3-7 cm across on stout, naked peduncles. Involucre 7-20 mm long, bracts oblong to broadly lanceolate, rather thick, rough hairy. Rays dark rich yellow, 1-3 cm long, female, and fertile, with 3-angled achenes. Achenes dark brown, 4-5 mm long, the pappus scarcely evident. Disk flowers yellow, bisexual, fertile with 4-angled achenes.

III. Natural Distribution, Adaptation, Range, and Associated Plant Community:

A. Natural Distribution of Species - Refer to Figure No. 1. Primarily located in the eastern one-half of the United States. It is not common in occurrence.

B. Adaptation Range of Cultivar - Refer to Figure No. 1. This cultivar is primarily adapted in the eastern one-half of Nebraska, Kansas, and Oklahoma. It can be planted on rocky slopes and roadsides. Adequate moisture is necessary for proper growth although this variety, scabra, is better adapted to dry sites than is the variety helianthoides. Although the full range of the cultivar adaptability has not been fully tested, it is most likely adapted in most of Iowa, Missouri, and western Arkansas.

C. Associated Plant Community - Rough oxeye is associated with plant communities of the true prairie. Although seldom abundant it is widely scattered among prairie grasses in glades and along stream and creek banks. Its importance as a forage ranges from poor to good for cattle and sheep.

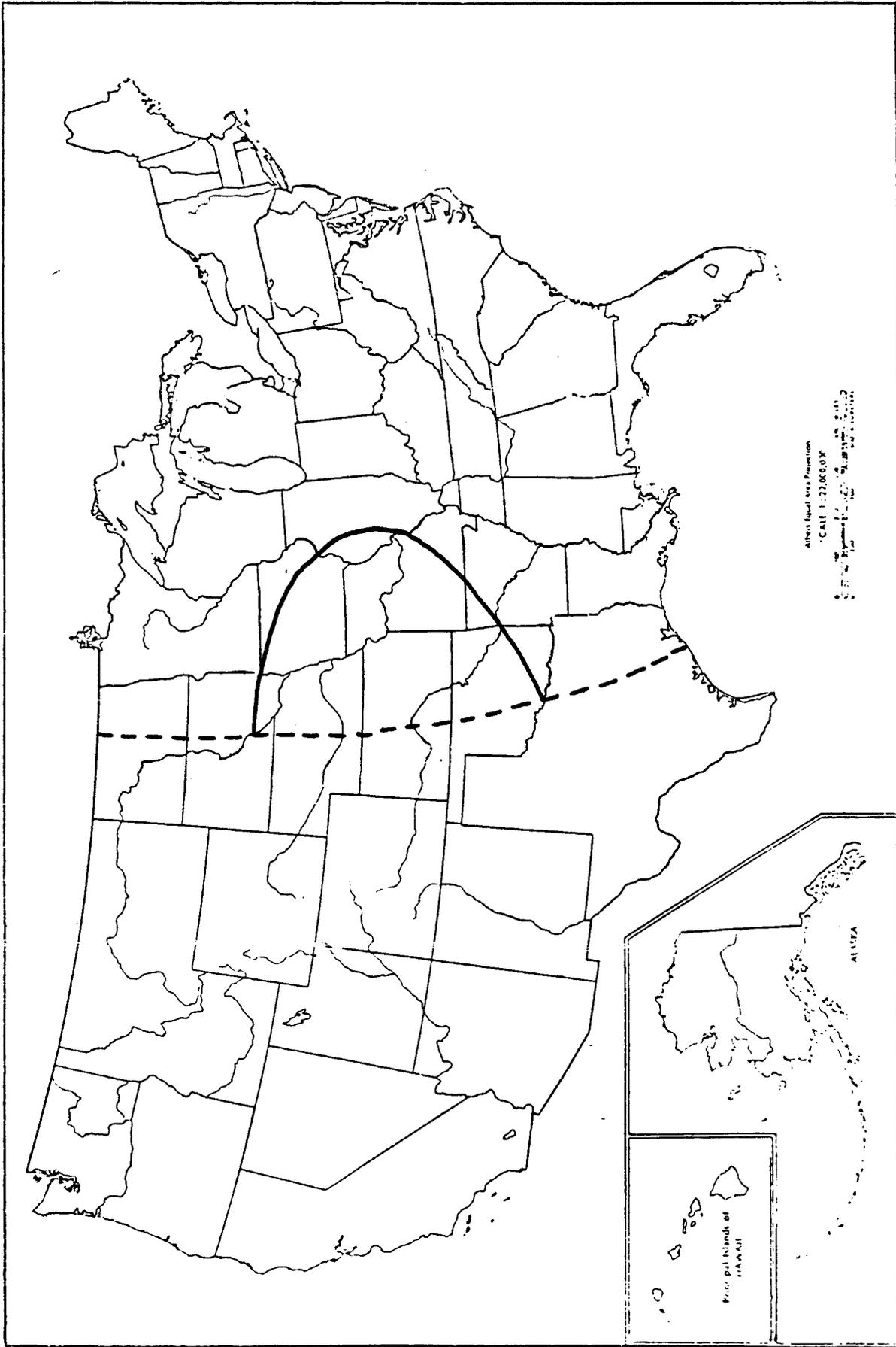


FIGURE 1. MAP SHOWING NATURAL DISTRIBUTION OF ROUGH OX-EYE (area enclosed with broken line) AND APPLICATION OF CULTIVAR ' MIDAS ' (area enclosed with solid line).

#### IV. Procedures Used in Developing the Cultivar:

PI-421379 was tested as PMK-1098 until 1979 when the PI number was assigned. This accession was selected from a small assembly of *Heliopsis* species from Greenwood County, Kansas, planted on the Manhattan Plant Materials Center (PMC) in 1970.

It was not until 1972 when 7 bulk pounds of seed was available that any attempt was made to make field plantings and these of course were very limited in size. The seed increase field on the Plant Materials Center was increased in size to its present 0.25 acre.

Table 1 indicates the average stand of various forbs including PI-421379 in replicated plots on the Manhattan Plant Materials Center during the period 1979 to 1982.

#### V. Field Performance of Rough Oxeye 'Midas':

A summary of the overall performance of PI-421379 is presented in Table 2. Generally field plantings were most successful when seed was planted by a grass drill and less successful when broadcast on the soil surface. Also, plantings were most successful when grown in the 11.8+ cm (30+ inch) precipitation zone or received supplemental irrigation.

#### VI. Seed Production and Other Related Data of Rough Oxeye:

Seed production of rough oxeye in pure stand plantings at the Manhattan Plant Materials Center (PMC) has been successfully accomplished without major difficulties. A vigorous seedling can be expected which is capable of producing a good seed crop its first growing season.

##### Commercial Seed Field Establishment

Plantings should be made on a well prepared, weed-free seedbed. Fallowing for two preceding growing seasons is highly desirable for maximum weed control and to insure that there are no undesirable herbicide residues remaining in the soil. Perennial rhizomatous weeds such as bermudagrass, yellow nutsedge, and field bindweed should be controlled before planting.

Soil tests should be made before planting to establish levels of available macronutrients, pH, and organic matter. Moderate levels of available phosphorous (25 lb./ac. or 28.5 kg/ha.) and potassium (150 lb./ac. or 171 kg/ha.) are desirable. Moderate levels of nitrogen are required for good seed production on low organic matter soils. Nitrogen levels for maximum seed production have yet to be determined.

Rough oxeye seed fields should be planted in rows 32-40 inches (.8-1 m) apart. Seeding rates have been successful at 15 pure live seed per square foot (156 pure live seed per square meter). At a row spacing of 3 feet (.9 m), a target planting rate of 45 pure live seed per foot has proven satisfactory. Seedlings can be weeded with conventional cultivators or roto-tillers until about the eighth week of the growing season when plant size prohibits tractor operation.

TABLE I Average Stand of Forb Plants/Plot (500 Sq. Ft.) Under 3 Grassland Mixes at 2 Population Levels  
Average of 3 Replications  
1979 - 1982

Grass Seeding Rate Grass Seeding Mixture Year (1979-1982)	20 PLS/Sq. Ft.										40 PLS/Sq. Ft.													
	Sandyland					Tall Grass					Sandyland					Tall Grass								
	79	80	81	82	82	79	80	81	82	82	79	80	81	82	82	79	80	81	82	82				
<i>Lespedeza capitata</i>	10	10	10	10	14	10	8	7	9	20	13	10	10	28	30	36	18	13	13	8	10			
roundhead lespedeza																								
<i>Lula purpurea</i>	3	3	3	3	10	8	2	5	3	7	1	2	3	10	4	4	2	20	4	6	7	8	2	4
purple prairieclover																								
<i>Liatris punctata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
dotted gayfeather																								
<i>Salvia aurea grandiflora</i>	22	13	1	8	32	20	2	8	25	13	1	6	22	32	2	6	38	32	6	8	15	18	5	6
pitcher sage																								
<i>Schrankia nuttallii</i>	7	5	4	7	7	5	4	5	2	3	4	4	5	0	4	6	2	13	6	6	7	7	4	6
catsclaw sensitivebriar																								
<i>Fatibida pinnata</i>	2	3	3	3	0	3	2	2	3	0	0	.33	0	2	.33	2	0	2	.33	2	3	2	2	2
grayhead prairieconeflower																								
<i>Helianthus helianthoides var scabra</i>	7	3	3	2	5	3	1	2	3	8	2	.66	7	8	1	1	0	5	3	.66	5	7	1	1
rough oxeeye																								
<i>Desmanthus illinoensis</i>	5	10	4	6	3	5	3	4	2	3	2	6	3	5	4	6	5	3	3	4	0	8	4	6
Illinois bundleflower																								
<i>Cirsia fasciculata</i>	17	165	7	5	40	193	4	5	8	675	9	4	20	810	9	5	23	528	7	5	32	915	13	5
partridgepea																								
<i>Asclepias tuberosa</i>	12	3	0	.33	18	3	.33	.33	5	2	0	.33	5	2	.33	.33	17	3	0	0	7	8	1	0
butterfly milkweed																								
<i>Amorpha canescens</i>	0	0	0	.66	0	0	0	1	0	0	0	1	0	0	0	.66	0	0	0	.66	0	0	0	.33
leadplant																								
<i>Echinacea pallida angustifolia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
blacksamson																								
<i>Liatris pycnostachya</i>	3	0	0	0	-	-	-	-	0	0	0	0	0	0	0	-	-	-	-	-	0	0	0	0
thickspike gayfeather																								
<i>Silphium laciniatum</i>	0	0	0	0	-	-	-	-	0	0	0	.33	0	0	0	-	-	-	-	-	3	2	1	2
compassplant																								
<i>Lespedeza stuevei</i>	12	7	2	4	-	-	-	-	10	7	2	3	10	7	3	2	-	-	-	-	3	7	2	2
stueves lespedeza																								
Total Forb Stand, Av./Plot	98	237	37	44	135	266	27	43	82	678	38	32	95	885	38	44	118	618	45	44	95	755	43	40

\*Thickspike gayfeather, compassplant and stueves lespedeza were not planted in the mid-grass mixture.

Average Total Stand of Forb Plants/Plot (500 Sq.Ft.) Under 3 Grassland Mixes at 2 Grass Seeding Rates (Average of 3 Replications)

	1979				1980				1981				1982			
	20 PLS	40 PLS														
Sandyland	98	95	237	885	37	44	118	618	27	45	43	44	44	44	44	44
Mid-Grass	135	118	266	618	27	45	43	44	44	44	44	44	44	44	44	44
Tall Grass	82	95	678	755	28	43	32	40	32	40	32	40	32	40	32	40

TABLE 2

## FIELD PLANTINGS OF ROUGH OXEYE - PI-421379

<u>State</u>	<u>MLRA</u> <u>1/</u>	<u>Date</u> <u>Planted</u>	<u>Purpose</u>	<u>Stand</u> <u>2/</u>	<u>Vigor</u> <u>2/</u>
OK	78	3-80	Wildlife	5	3
OK	78	4-81	Wildlife	9	7
OK	112	4-81	Wildlife	3	3
OK	84	4-81	Wildlife	9	5
OK	112	4-82	Critical Area	7	5
OK	80	3-83	Wildlife	7	5
OK	112	3-83	Wildlife	7	5
OK	112	3-84	Wildlife	5	5
KS	112	4-77	Critical Area	9	7
KS	73	3-80	Range	3	3
KS	72	3-80	Critical Area	3	3
KS	74	4-81	Critical Area	4	3
KS	74	3-82	Critical Area	9	7
KS	74	3-82	Critical Area	3	3
KS	72	5-82	Wildlife	9	7
KS	73	5-83	Wildlife	7	7
KS	112	4-84	Wildlife	5	5
NE	106	3-75	Wildlife	7	5
NE	107	3-77	Wildlife	7	5
NE	71	3-80	Wildlife	7	7
NE	65	3-82	Wildlife	3	5
NE	102	9-83	Wildlife	5	5
NE	102	4-83	Wildlife	5	5

1/ Major Land Resource Area

2/ Visual Observation

(1) Excellent; (3) Good; (5) Average; (7) Fair; (9) Poor; (0) Failure

## Seed Harvesting and Cleaning

Rough oxeeye will produce seed during its first growing season and normally matures from mid-August to early September. The seed shatters easily when mature and should be harvested when the majority of seed heads have turned brown. Harvesting and cleaning of seed can be performed with conventional equipment if adjusted properly.

Average settings for harvesting and cleaning equipment follow based on experience at the PMC. These equipment settings should be considered a starting point and may require alterations based on individual crop year and growing conditions.

<u>Combine Settings</u>			<u>Seed Cleaning Settings</u>			
<u>Concave Clearance</u>	<u>Cylinder Speed</u>	<u>Air Intake</u>	<u>Scalper</u>		<u>Cleaner</u>	
			<u>Upper</u>	<u>Lower</u>	<u>Upper</u>	<u>Lower</u>
.5 in. (12mm)	1,100 rpm	15% open	10/64	1/18	8/64	1/16

Combined material should be dried carefully. This can be accomplished with most types of forced air grain drying systems. Air temperature should not exceed 110 degrees F. (43 degrees C).

Seed yield of most native plant species can be quite variable. Production at the Manhattan PMC has ranged from 60-225 pounds per acre. Under good growing conditions and proper management, rough oxeeye can be maintained in a seed production stand for up to five years.

The following table indicates seed quality for the years 1979 to 1983 as determined by the Kansas Department of Agriculture Seed Laboratory.

TABLE 3

### Seed Tests of Heliopsis helianthoides var. scabra PI-421379

<u>Crop Year</u>	<u>Purity</u>	<u>Germ.</u>	<u>Test Date</u>
1979	98.72	63	9-83
1980	96.87	77	9-83
1981	99.68	78	9-83
1982	99.82	82	9-83
1983	91.01	82	1-84

#### VII. Seed Increase and Distribution:

Foundation quality seed of rough oxeeye 'Midas' will be produced and distributed by the U.S.D.A. Soil Conservation Service Plant Materials Center, Manhattan, Kansas.

#### VIII. Potential Uses:

Critical area planting, reestablishing prairies, roadsides and rest areas, and recreation areas.

*Thomas Deebing* **ACTING**  
Approved: State Conservationist, Kansas  
USDA-Soil Conservation Service

JUL 12 1984  
Date

*Edward R. Dyer* **ACTING**  
Approved: State Conservationist, Nebraska  
USDA-Soil Conservation Service

*July 30, 1984*  
Date

*John Decker*  
Approved: Dean of Agriculture and Director of  
Agricultural Experiment Station  
Kansas State University

*July 13, 1984*  
Date

*Irvin I. Outwest* *by DTU*  
Approved: Dean and Director, Agricultural  
Experiment Station  
Nebraska University

*Nov. 6, 1984*  
Date

*John M. Sulley Jr. (acting)*  
Approved: Deputy Chief, Technology Development  
USDA-Soil Conservation Service, Washington, D.C.

*12/12/84*  
Date

*James H. ...*  
Approved: Director - State Engineer  
Nebraska Department of Roads

*11/5/84*  
Date