

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

AND

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

AND

NORTH DAKOTA AGRICULTURAL
EXPERIMENT STATION

AND

MINNESOTA AGRICULTURAL
EXPERIMENT STATION

AND

SOUTH DAKOTA AGRICULTURAL
EXPERIMENT STATION

ANNOUNCE THE RELEASE OF 'TOMAHAWK' INDIANGRASS.

Tomahawk indiangrass [*Sorghastrum nutans* (L.) Nash] was developed by the USDA Soil Conservation Service (SCS), Plant Materials Center, Bismarck, North Dakota and released in cooperation with the USDA Agricultural Research Service (ARS), Mandan, North Dakota; the North Dakota Agricultural Experiment Station (NDAES), Fargo, North Dakota; the Minnesota Agricultural Experiment Station (MAES), St. Paul, Minnesota; and the South Dakota Agricultural Experiment Station (SDAES), Brookings, South Dakota.

Tomahawk indiangrass, was tested as ND-444 (PI-478006). It originated as a composite of three seed collections made in 1961 from native stands. ND-343 was collected near Ludden, North Dakota with SD-56 and SD-44 coming from Britton and Hecla, South Dakota, respectively. Initial evaluation of the collections were conducted in comparison with other accessions of indiangrass at the Bismarck Plant Materials Center. The three accessions were selected for high seed yield and winter survival. Equal quantities of seed from the three accessions were composited to form ND-444. A .2 acre seed increase field was established at the Plant Materials Center in 1964.

Phenology, forage yield, persistence, and wildlife habitat potential has been tested in advanced evaluation studies and field plantings located throughout North Dakota, South Dakota, and Minnesota. Tomahawk is the earliest maturing cultivar tested and has demonstrated superior winter hardiness and persistence. When grown at northern latitudes, average forage production over years of Tomahawk is similar to Holt and exceeds that of Osage, Oto, and Rumsey. Cultivars from southern sources (Holt, Osage, Rumsey, Oto) initially produce more forage in areas where Tomahawk is adapted, but stand density of the southern cultivars eventually decreases leaving Tomahawk as the highest forage producer. Over all locations tested, average forage yield of Tomahawk exceeded that of Rumsey, but was less than Holt, Osage, and Oto.

The mean flowering dates (anthesis) for indiangrass ecotypes have a northwest to southeast gradient in the northern Great Plains. Phenology evaluations at Fergus Falls, Minnesota, indicate Tomahawk to be **33** days earlier in maturity than Holt, 71 days earlier than Oto, and **82** days earlier than Osage and Rumsey. Holt, Oto, Rumsey, and Osage do not consistently produce viable seed in northern portions of the Great Plains. The release of Tomahawk extends the area of adaptation of indiangrass further north than with presently available cultivars.

The primary area of use of Tomahawk is on sites where indiangrass is recommended for range and pasture seedings, wildlife habitat and natural area development, revegetation of surface mined land, erosion control structures, and transportation corridors in the eastern one-half of North Dakota and South Dakota; and the western one-half of Minnesota.

Breeder seed of Tomahawk indiangrass will be maintained by the USDA SCS Plant Materials Center, Bismarck, North Dakota. Foundation and certified generations of seed increase beyond breeders seed are authorized. Foundation seed will be available from the USDA SCS Plant Materials Center, Bismarck, North Dakota **58502**.

Release date for publicity purposes shall be effective on the date of final signature of the release notice.

William Selig 5/27/88
Chief Date

United States Department of Agriculture
Soil Conservation Service
Washington, DC

M. E. Carter JUN 14 1988
Administrator Date

Agricultural Research Service
United States Department of Agriculture
Washington, DC

Lennie J. Clark 3/29/88
State Conservationist Date

United States Department of Agriculture
Soil Conservation Service
Bismarck, North Dakota

H. R. Lund 5-19-88
Director Date

North Dakota Agricultural
Experiment Station
Fargo, North Dakota

Duane Johnson 3/31/88
State Conservationist Date

United States Department of Agriculture
Soil Conservation Service
St. Paul, Minnesota

C. Eugene Allen 4/8/88
Director Date

Minnesota Agricultural
Experiment Station
St. Paul, Minnesota

Bill Martin 5/3/88
State Conservationist Date

United States Department of Agriculture
Soil Conservation Service
Huron, South Dakota

R. D. Moore 5/6/88
Director Date

South Dakota Agricultural
Experiment Station
Brookings, South Dakota

Data to Support Release of Tomahawk indiagrass

Cultivar: 'Tomahawk'

Accession No.: ND-444, PI-478006

Common Name: indiagrass

Scientific Name: Sorghastrum nutans (L.) Nash Symbol: SONU

Description: Tomahawk indiagrass is a native perennial warm-season, tall grass, capable of producing a sod from short rhizomes. Culms 1 to 2.5 m tall from short scaly rhizomes; blades elongate, flat mostly 5 to 10 mm wide, tapering to a narrow base, scabrous; panicle narrow, yellowish rather dense 15 to 30 cm long, contracted and darker at maturity, summit of branchlets, rachis joints, and pedicels grayish-hirsute; spikelets 6 to 8 mm long, lanceolate, hirsute, the awn 1 to 1.5 cm long, once geniculate. (Hitchcock 1951)

Indiagrass is found on subirrigated lowlands on nearly level to gently undulating glacial till plains, overflow sites, level swales and depressions and bottomlands along rivers and streams. Quebec and Maine to Manitoba and North Dakota, south to Florida and Arizona, Mexico. (Hitchcock 1951)

Origin: Tomahawk indiagrass originated from a composite of three seed collections from native stands in 1961. All were from similar areas in the vicinity of Ludden, North Dakota (ND-343) and Britton and Hecla, South Dakota (SD-56 and SD-44). A .2 acre seed increase field was established on the USDA Soil Conservation Service, Plant Materials Center in 1964.

Uses: Tomahawk is recommended for range and pasture seedings, wildlife habitat and natural area development, critical areas and transportation corridors in south-eastern North Dakota, east-central South Dakota, and west-central Minnesota.

Performance: Initial evaluation studies were conducted from 1962-1964 in comparison with other accessions of indiagrass on the Bismarck Plant Materials Center (Table 1). Tomahawk was selected for high seed yields and winter survival.

The phenology, forage quantity, and wildlife habitat potential has been extensively evaluated in advanced evaluation studies and field plantings located throughout North Dakota, South Dakota, and Minnesota (Tables 2, 3, 4, and 5).

Phenology: Phenology data recorded at Fergus Falls, Minnesota indicate Tomahawk to be 33 days earlier in maturity than Holt. It is 71 days earlier than Oto and 82 days earlier than Osage and Rumsey. Holt, Oto, Osage, and Rumsey do not consistently mature viable seed in northern latitudes (Table 2).

Soils: Tomahawk may be used on sites where indiagrass is recommended in the USDA SCS, North Dakota, South Dakota, and Minnesota Technical Guides. It is best suited to deep, well drained soil, but is tolerant of moderately wet soil.

Adaptation: The primary area of adaptation for Tomahawk is on sites where indiagrass is recommended in the Major Land Resource Areas:

North Dakota: 53B - Central Dark Brown Glaciated Plains (south half); 54 - Rolling Soft Shale Plain; 55B - Central Black Glaciated Plain; and 56 - Red River Valley of the North (south half).

South Dakota: 53B and 53C - Central and Southern Dark Brown Glaciated Plains; 55B - Central Black Glaciated Plains; 55C - Southern Black Glaciated Plains; 63A and 63B - Rolling Pierre Shale Plains; and 102A - Rolling Till Prairie.

Minnesota: 56 - Red River Valley of the North (south half); 57 - Northern Minnesota Gray Drift; 90 - Minnesota Thin Loess and Till; 91 - Minnesota Sand Outwash; and 102A - Rolling Till Prairie.

The physical features are described in Land Resource Regions and Major Land Resource Areas of the United States (USDA, SCS, 1981).

Seed Production: Stand establishment of Tomahawk can usually be accomplished in one growing season. The second growing season may be needed to develop increased vigor and forage. Seed production can be expected the second year and continue indefinitely, provided good management techniques are applied.

References:

- Hitchcock, A. S. 1951. Manual of the grasses of the United States. 2nd ed. Rev. by Agnes Chase. US Dept. Agr. Misc. Pub. No. 200. Washington, D.C.
- USDA Soil Conservation Service. 1981. Land Resource Regions and Major Land Resource Areas of the United States, Agric. Handbook 296, 156 p.
- USDA Agricultural Research Service, 1960. Plant Hardiness Zone Map. USDA Misc. pub. 814.

Prepared by: The data to support release of Tomahawk indiagrass was assembled by Russell J. Haas, **Plant** Materials Specialist and Dwight A. Tober, Plant Materials Center Manager, Soil Conservation Service, Bismarck, North Dakota, Erling T. Jacobson, Plant Materials Specialist, MNTC, Soil Conservation Service, Lincoln, Nebraska, and Dr. Reed E. Barker, Research Geneticist, USDA, ARS, NPGPRL, Mandan, North Dakota.

Table 1. Initial evaluation of indiagrass accessions 1962 - 1964. United States Department of Agriculture, Soil Conservation Service, Plant Materials Center, Bismarck, North Dakota.

Accession	Seed Yield				Forage Yield (dry weight)
	1962	1963	1964	x	1964
-----lbs/ac-----					
NE-2909	233	386	63	227	--
MDN-924	---	242	287	265	5445
ND-343*	---	338	238	288	4356
ND-380	---	---	77	77	3319
SD-10	75	---	---	75	--
SD-12	10	386	177	191	--
SD-17	10	80	---	45	--
SD-37	---	193	61	127	4719
SD-42	---	193	345	269	5082
SD-44*	---	338	326	332	7260
SD-49	---	193	53	123	5082
SD-56*	---	435	284	359	4719
SD-65	---	---	131	131	7048
SD-66	---	---	100	100	--
SD-67	---	---	128	128	--
SD-80	---	---	15	15	8297
SD-86	---	---	14	14	6637
SD-90	---	---	342	342	8712
SD-110	---	---	109	109	--

* Accessions combined to form Tomahawk indiagrass.

Table 2. Maturity ratings of indiagrass cultivars grown at four (4) locations.

Cultivar/ Accession	Origin	Upham, Fergus Falls, Lake Andes, Pierre, Overall				Average
		ND	MN	SD	SD	
		1984	1983	1984	1986	\bar{x}
Tomahawk (ND-444)	North and South Dakota	4	5	5	6	5
Holt	Holt County, Nebraska	2	3	3	4	3
Oto	Kansas, Nebraska	1	1	2	3	2
Osage	Kansas, Oklahoma	1	1	2	3	2
Rumsey	Missouri	1	1	2	2	2

Maturity Ratings:

- 1 = vegetative
- 2 = boot
- 3 - first emergence of inflorescence, 10 culms or more
- 4 = first anthesis, 10 culms or more
- 5 = 50 percent anthesis
- 6 = first seed ripe
- 7 = 50 percent of seed ripe
- 8 = seed mature
- 9 = complete dormancy

* Mean of ratings from four (4) dates

** Mean of ratings from seven (7) dates

*** Mean of ratings from eight (8) dates

Table 3. Mean annual production of indiagrass cultivars at four (4) locations.

Cultivar/ Accession	(4) Upham, ND	(4) Fergus Falls, MN	(3) Lake Andes, SD	(2) Pierre, SD	Overall Average
	-----lbs/ac-----				
Tomahawk (ND-444)	4369 ^a ^{1/}	3392 ^a	3376 ^b	2746 ^b	3470
Holt	4169 ^b	4723 ^a	5793 ^{ab}	3599 ^a	4571
Oto	2904 ^b	2693 ^a	8050 ^a	4396 ^a	4511
Osage	2389 ^b	3575 ^a	7733 ^a	3470 ^{ab}	4292
Rumsey	1216 ^c	2807 ^a	5501 ^{ab}	851 ^c	2594

() Indicates number of years of data averaged, each trial contained three replications.

^{1/} Means within a column followed by the same letter are not significantly different at the .05 level using Duncans Multiple Range test.

Table 5. Plant density of indiagrass cultivars at four (4) locations

Cultivar/ Accessions	Upland, ND		Fergus Falls, MN			Lake Andes, SD		Pierre, SD			Overall Average		
	1982	\bar{x}	1983	1984	1985	\bar{x}	1984	1984	1985	1986		\bar{x}	
Tomahawk (ND-444)	16	18	19	18	17	23	23	16	14	25	17	19	19
Holt	16	14	26	19	11	23	17	15	24	29	25	26	19
Oto	18	5	7	10	17	25	21	20	21	24	34	26	19
Osage	16	3	5	8	10	21	16	22	17	21	27	22	17
Rumsey	13	3	8	8	3	9	6	2	14	3	18	12	7

plants/ft²

Each trial contained three replications.