HARD OR FAIRGROUNDS GRASS (SCLEROCLOA DURA, POACEAE) IN THE GREAT LAKES REGION

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ABSTRACT

First reported in the Great Lakes region from an athletic field near Cincinnati, Ohio in 1990, Sclerochloa dura has now been located in at least 162 additional sites, most during the last seven years on fairgrounds. This species is now known from seven states and Ontario in the region; first reports from Pennsylvania, West Virginia, and Wisconsin and the rediscovery of Sclerochloa dura in New York are presented here. We present several theories in an attempt to account for this distribution; most feature some type of transport of equipment or animals between fairgrounds.

Non-native species usually are found in generalized habitats. Their distribution and frequency are dependent upon their abilities to invade and rapidly colonize disturbed sites. Examples of such opportunistic and widespread species in North America include Taraxacum officinale Weber, Poa annua L. and Plantago lanceolata L. Native species, to the contrary, usually are restricted to specific habitats, often ones of exceedingly narrow biological parameters. Many well-known rarities are examples of this situation, such as Cypripedium candidum Muhl. and the U.S. federally-listed Trifolium stoloniferum Muhl.

Our work in the Great Lakes region over the past seven field seasons suggests that Sclerochloa dura (L.) P. Beauv. (Poaceae) may present a remarkable reversal of this pattern. This species has specific preferences of soil and disturbance. When these conditions exist, the grass usually is present. Indeed, the predictability of locating Sclerochloa dura plants is remarkable; given the proper factors, the species likely will be found, often in abundance and seemingly firmly established. Sclerochloa dura colloquially is known as hard grass or fairgrounds grass. The name “hard grass” refers to the firm, almost bony glumes. “Fairgrounds grass”, first appearing in Swink and Wilhelm (1994), alludes to its affinity for the types of habitat and disturbance found on fairgrounds.

COLLECTION HISTORY

Sclerochloa dura (Fig. 1) is a annual species of the Poöideae native from southern Europe to western Asia (Tsvelev 1984). It is considered to be a “good
pasture plant” (Rozhevitz 1934) in “spring ephemeral pastures” (Tsvelev 1984) of Russia. Brandenburg et al. (1991) summarized the collection history of this species in North America. It first was collected in 1895 near a woolen mill in Yonkers, New York. This population apparently failed to survive as it was not recollected anywhere in New York state until 2000: R. S. Mitchell, pers. comm. and Rabeler 1429, BH, CM, MICH, NYS, US (abbreviations follow Holmgren et al. 1990). By 1944, S. dura had been found in seven western states: California, Colorado, Idaho, Oregon, Texas, Utah (the site of the first western collection in 1928), and Washington. In the following decades, the species spread to Arkansas, Kansas, Missouri, Nebraska and Oklahoma. The first recent collection east of the Mississippi River was made in Georgia in 1982. By 1991, single collections had been made in four other eastern states: Maryland, Ohio, Tennessee, and Mississippi (Brandenburg et al. 1991). This brought the total to eighteen states as of 1991. Recent North American collections outside of the Great Lakes region have also been made in Iowa (Eilers and Roosa 1994), Louisiana (Saichuk et al. 2000), Arizona (Reeder 2001), and British Columbia, Canada (Oldham 2001).

Although this distribution is extensive, the number of documented populations in almost any state is exceedingly few. This clearly can be seen in the dot map in Brandenburg et al. (1991) where the occurrence of S. dura in 10 of 18 states is based on single populations.

Within the Great Lakes region, the first collection of hard grass was made in
1990 from an athletic field near Cincinnati (Hamilton Co.), Ohio (*Cusick* 28795 & *Baird*, MICH, MU). In 1992, Ken Dritz located the species at four sites in Illinois and one in Michigan (Swink and Wilhelm 1994); these were the first collections for these states. The first Indiana record was gathered in 1993 (*Beard* 166, MOR). All of these six recent collections had an important factor in common; they were made in county fairgrounds, often in or near arenas for showing and racing horses.

**A FAIRGROUNDS SURVEY**

In 1995, Cusick began a systematic survey for exotic species at fairgrounds in Ohio. Such sites are common in the state; there is at least one fairground in each of the 88 Ohio counties. Agricultural fairs long have played a significant role in the Midwest. In addition to county fairs, there also are a host of 4-H, Junior, FFA (Future Farmers of America) and independent fairs in the Midwest. Some urban counties retain a fair as a symbol of their past agricultural heritage, e.g., the Cuyahoga and Hamilton county fairs in the Cleveland and Cincinnati areas respectively. Cusick soon discovered that fairgrounds are a rich and neglected source of county and state distributional records, particularly those of spring ephemerals. Dritz apparently noted a similar pattern in the Chicago region (Swink and Wilhelm 1994). The typical fairground offers large grassy expanses, park-like settings of mature trees, broad roadside shoulders, gravel and dirt roadbeds, weedy edges of buildings and, most importantly, racetracks and facilities for horses (arenas, barns, and show rings). Opportunistic invaders have an ideal setting for propagation and survival, depending on the maintenance or the lack thereof. Events at most fairgrounds are scheduled during summer and fall months. Species blooming and fruiting in the spring can attain full development before the flurry of weeding and cleaning begins prior to the event season.

It quickly became obvious that *Sclerochloa dura* was a common and significant element in the fairground flora in Ohio. Extensive populations often were located, particularly in association with equestrian facilities. Cusick “introduced” hard grass to both other authors in early 1997, interesting them to expand the search in Michigan and Ontario. Michael A. Vincent of Miami University also was recruited to help survey for hard grass in Indiana and Ohio.

As a result of this survey, *Sclerochloa dura* has been added to the floras of Pennsylvania, West Virginia, Wisconsin, and Ontario, Canada. Oldham’s collections from two Ontario fairgrounds in 1997 were the first in Canada (Oldham 1998, Oldham et al. 1998). The species also was relocated in New York state where it had not been reported for more than a century. Specimen citations for these records are given in Appendix I.

We now appreciate how frequent hard grass is in the Great Lakes region; there are now 145 documented populations of *S. dura* at fairgrounds in this area. *Sclerochloa dura* is not an uncommon species of widely scattered occurrence. Instead, it is a common element of a circumscribed habitat. This habitat has not received much attention from botanists in the past and thus a widespread species
has been overlooked. The map in Figure 2 summarizes our present knowledge of the occurrence of *Sclerochloa dura* at fairgrounds in the Great Lakes region. This is based on fairgrounds surveyed by one or more of the authors during the past seven years. The dots represent counties in which *Sclerochloa* was found in at least one fairground while open circles indicate counties where we have searched one or more fairgrounds but did not locate *S. dura*. The “known/absent” tally by counties in states/provinces where we have surveyed extensively is: Indiana, 32/8; Michigan, 27/33; Ohio, 59/28; Ontario, 2/10. Our surveys in other states have been minimal with only a few sites surveyed. Vouchers for these collections are mostly at MICH and OS. Collections by others included in this map are by Dritz (four near Chicago; at MOR) and Beard (St. Joseph Co., Indiana; at MOR). Many of the hard grass populations at these sites are extensive. The ground is often virtually carpeted with mats of *S. dura* in the spring.
ATHLETIC FIELDS

Brandenburg et al. (1991) noted that *Sclerochloa dura* was often found in “the most disturbed areas in playgrounds and athletic fields” (p. 370). Brandenburg and Thieret (1996) reported the first records of hard grass in Kentucky from athletic fields. They visited 12 such sites in northern Kentucky, finding hard grass in nine of them. They postulated that the seeds were transported from site to site in mud on athletic shoes.

Figure 3 illustrates the known occurrences of *Sclerochloa dura* on athletic fields in the Great Lakes region. As in Figure 2, open circles indicate counties where at least one athletic facility was searched without success. Beyond the Cincinnati area (where most of the collections were made by J. W. Thieret), *S. dura* has seldom been found in similar settings. One of two such Michigan locations consists of a few plants growing on an athletic field in the middle of a race-
track at the Tuscola County fairgrounds (Rabeler 1406 & Cusick, MICH). A similar hybrid habitat with hard grass is at the Shelby County, Indiana, fairground where hard grass is common (Cusick 34838 & Vincent, MU). A related habitat is the clay surface adjacent to tennis courts in a Columbus, Ohio, city park (Cusick 34895, OS).

OTHER HABITATS

*Sclerochloa dura* has been found only sparingly in other habitats in the Great Lakes Region. These occurrences are mapped in Figure 4; all collections except a Champaign Co., Illinois collection (*Hill 27815* at ILLS) are by the authors. Many of these sites are graveled parking lots and roadbeds. On Ohio’s Lake Erie islands, hard grass is well-established at ferry docks and marinas. The single Kentucky collection is from muddy earth at a boat ramp (Harrison County, *Cusick 35266*, MICH). Brandenburg et al. (1991) stated that *S. dura* also was

FIGURE 4. Occurrences of *Sclerochloa dura* in other habitats in the Great Lakes region.
known from “campsites, roadsides, golf courses”. It is also known from a few agricultural sites. Saichuk et al. (2000) found it along the edge of a road in a rice field in northeast Louisiana, Charles Bryson collected it in reduced tillage soybean and no-till cotton fields in west-central Mississippi (Bryson 16268, MICH), and hard grass is found along field edges in southeastern Missouri (G. Yatskievych, pers. comm.). In our experience, such occurrences are in the minority in the Great Lakes states. In spite of the prevalence of hard grass at fairgrounds, we do not yet know of any reports of this species being found in an agricultural setting in the Great Lakes region.

SUBSTRATE AND ASSOCIATES

In reporting Sclerochloa dura as new to Missouri, Ladd (1983) noted it was found in “severely disturbed, usually compacted” sites. Compacted clay is a common denominator for many fairground populations of S. dura. Contrary to the often-cited habitat preference of sandy or gravelly soils (Chase 1951, Yatskievych 1999), a clay substrate seems to be directly correlated to the occurrence and frequency of this species on such sites. We have found repeatedly that the most likely places to find S. dura are the clay surfaces of race tracks and the roadways immediately adjacent to the track. This relationship is also illustrated in the map in Figure 2. Hard grass is apparently absent from most fairgrounds north of central Michigan. Sand, rather than clay, is a far more common substrate in Michigan north of Saginaw Bay (Cusick & Rabeler, pers. obs.)

In these sites, Sclerochloa dura can be abundant and form a monoculture or may appear with some combination of the following associates: Polygonum aviculare L., Matricaria discoidea DC., Lepidium ruderale L., Poa annua L., Poa bulbosa L., Hordeum pusillum Nutt., and Scleranthus annuus L. This “fairgrounds association” may actually have an Old World origin. It is interesting to note that the first three species in this list are the primary associates in the Scle-rochlooo-Polygonetum avicularis, or “parched Hardgrass-Knotgrass carpet” (Ellenberg 1988) vegetation community which occurs sparingly along dry, heavily trampled or trodden areas (especially roads) of central Europe, particularly Germany (Korneck 1969) and Czechoslovakia (Sládek 1997) and other Balkan countries. It appears that the fairground provides a large expanse of similar conditions; dry, often hard, compacted sites devoid of plants that cannot withstand the damage that trampling and disturbance will cause. The phrase “track plants” that Ellenberg (1988) used to describe plants that inhabit such areas has far more significance in our case than we suspect he intended!

INTRODUCTION AND SPREAD OF SCLEROCHLOA DURA

Given the preponderance of fairground populations of Sclerochloa dura in the Great Lakes region, we feel it likely that the spread of this species is tied to the transport of animals, equipment, and/or supplies between fairgrounds. We sug-
gest that some of the populations may have come from states to the west and southwest of the Great Lakes. Hard grass is known from many sites from Missouri and Kansas to Texas. The species grows in at least two fairgrounds in eastern Texas, Collin County (Rabeler 1318, MICH) and Red River County (Rabeler 1325, MICH) and many in Kansas (C. Freeman, pers. comm.). Cusick and Vincent have found on Indiana and Ohio fairgrounds other species with mainly southern and western distributions, e. g., *Monolepis nuttalliana* (Roemer & Schultes) Greene and *Sibara virginica* (L.) Rollins. Swink and Wilhelm (1994) recorded both of these species in the Chicago region, noting *Sibara* as “introduced from the south” and *Monolepis* as “introduced from farther west”.

How is *Sclerochloa dura* transported from place to place? As it is most abundant in areas around racetracks, show rings and horse barns, a likely option is with bedding, feed or horse trailers. The seeds, or more likely the whole inflorescences, may be carried in earth caked on vehicles. Two observations, though, are at odds with this suggestion. First, as noted earlier, we have not found *S. dura* in agricultural lands outside a fairground in our area. This is puzzling if transport from farm to fair and return is involved. Secondly, *S. dura* is absent from some of the fairgrounds in the Amish settlements of central and northeast Ohio. We would expect to find it widespread in those areas where horses are so common.

Tractor pulling and other racing events are common activities taking place on fairgrounds. Many competitors in these events are from out-of-state locales. Perhaps *Sclerochloa dura* is transported in the earth adhering to tractors and pulling sleds and other vehicles which travel to and from such events. Similarly, amusement company vehicles also might spread hard grass. At one Michigan fairground, the *S. dura* occurs in the fair’s midway area; the amusement rides and refreshment stands here are provided by a company from central Ohio. An occurrence in Madison County, Ohio, is on the site of the state’s annual Farm Science Review. Farming equipment is transported to this area from throughout the Midwest. The Clark County, Ohio, fairgrounds is famous for its large antique and flea markets which draw buyers and sellers from hundreds of miles away. *Sclerochloa dura* grows abundantly in this fairground as it does at several other fairgrounds hosting similar events.

Clearly there are many avenues for the spread of this grass through the Great Lakes states and beyond. In this regard, the spread of *Sclerochloa dura* mirrors the dispersal of zebra mussel, *Dreissena polymorpha* (Pallas), from the Great Lakes to the Mississippi drainage. The mussels adhere to bottoms of boats and travel in that manner from one body of water to another. People are urged to clean boats and equipment before removing them from the water, a suggestion which is seldom complied with and difficult to enforce (D’Ittri 1997).

THE FUTURE OF *SCLEROCHLOA DURA* IN THE GREAT LAKES REGION

*Sclerochloa dura* is an adventive species that is highly opportunistic. While it can be found in thick, lush carpets of erect plants (e.g. Fig. 5, Madison Co., OH),
most of the time we see it as tiny prostrate plants barely consisting of more than a few leaves and an inflorescence (e.g., Fig. 1, Centreville, MI). This clearly shows the physiological amplitude that would make \textit{Sclerochloa dura} a successful weed. Brandenburg et al. (1991) noted that it was able to outcompete other weedy species in severely trampled areas. Dispersal of the plant appears to be by either the plant fragmenting or via the entire inflorescence (Brandenburg et al. 1991). Planting an inflorescence results in an instant “colony” rather than just a single individual (Rabeler, pers. exp.). This would give \textit{Sclerochloa dura} an important advantage for species establishment in new areas. The species gets multiple chances to establish itself.
Brandenburg et al. (1991) stated that *Sclerochloa dura* was both “under-collected and under-reported”. We have clearly demonstrated that to be the case in the Great Lakes region. During the course of our work, we have seen several of the populations appear and grow rapidly; e.g. the populations near the ferry docks on the Lake Érie islands. If, as in some areas, *Sclerochloa dura* continues to “escape” from fairgrounds and athletic fields, we feel that it definitely has the potential to become a widely distributed species of disturbed areas.

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LITERATURE CITED


Appendix I: Collection data for new state and provincial records of Sclerochloa dura and its rediscovery in New York.

CANADA. Ontario. Kent Co.: Ridgetown Fairground, Howard Twp., 42°26′50″N, 81°52′40″W, 20 May 1997, Oldham 19674 (DAO, MICH, TRT, WAT); Lambton Co.: open, moist disturbed area, Sombra Township, ca. 20 km SSE of Sarnia, 42°48′20″N, 82°16′50″W, 22 May 1997, Oldham & Cusick 19702 (DAO, MICH, TRTE).