

NAME OF SPECIES: <i>Oplismenus hirtellus</i> _(L.) P. Beauv. (1)	
Synonyms: <i>Oplismenus hirtellus</i> ssp. <i>undulatifolius</i> (Ard.) U. Scholz, <i>Oplismenus undulatifolius</i> (Ard.) Beauv., <i>Panicum undulatifolium</i> Ard. (2)	
Common Name: basketgrass (1) or wavyleaf basketgrass (2)	Cultivars? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
A. CURRENT STATUS AND DISTRIBUTION	
I. In Wisconsin?	1. YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
	2. <u>Abundance:</u>
	3. <u>Geographic Range:</u> Not currently known in WI
	4. <u>Habitat Invaded:</u> In Maryland and Virginia, the species has the ability to invade both disturbed areas as well as mature forests that have no disturbance (3). Disturbed Areas <input checked="" type="checkbox"/> Undisturbed Areas <input checked="" type="checkbox"/>
	5. <u>Historical Status and Rate of Spread in Wisconsin:</u>
	6. <u>Proportion of potential range occupied:</u> Though the species is currently only found in Maryland and Virginia, USDA predicts that about 30% of the U.S. is suitable for invasion, including southeastern Wisconsin. The areas suitable for invasion include: USDA Plant Hardiness Zones 6-13, areas with 30-100+ inches of annual precipitation, and the Köppen-Geiger climate classes of tropical rainforest, tropical savannah, mediterranean, humid subtropical, marine west coast, humid continental warm summers, and humid continental cool summers (4).
II. Invasive in Similar Climate Zones	1. YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> <u>Where (include trends):</u> Maryland and Virginia (5).
III. Invasive in Which Habitat Types	1. Upland <input type="checkbox"/> Wetland <input type="checkbox"/> Dune <input type="checkbox"/> Prairie <input type="checkbox"/> Aquatic <input type="checkbox"/> Forest <input checked="" type="checkbox"/> Grassland <input type="checkbox"/> Bog <input type="checkbox"/> Fen <input type="checkbox"/> Swamp <input type="checkbox"/> Marsh <input type="checkbox"/> Lake <input type="checkbox"/> Stream <input type="checkbox"/> Other: The species invades temperate environments and is typically found in full canopy hardwood forests, forest margins, and shady riparian zones. It has been recorded in coastal plain, piedmont, and montane regions (6).
IV. Habitat Affected	1. <u>Soil types favored or tolerated:</u> Appears to tolerate a wide range of pH and is primarily found on mesic sites (5, 10).
	2. <u>Conservation significance of threatened habitats:</u> The species is known to spread rapidly through hardwood forest natural areas and crowd out all herbaceous and tree seedlings (4).
V. Native Range and Habitat	1. <u>List countries and native habitat types:</u> It is native to southern Europe and east to India, Iran, and southeast Asia (6).
VI. Legal Classification	1. <u>Listed by government entities?</u> No (5)
	2. <u>Illegal to sell?</u> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Notes:
B. ESTABLISHMENT POTENTIAL AND LIFE HISTORY TRAITS	
I. Life History	1. <u>Type of plant:</u> Annual <input type="checkbox"/> Biennial <input type="checkbox"/> Monocarpic Perennial <input type="checkbox"/> Herbaceous Perennial <input checked="" type="checkbox"/> Vine <input type="checkbox"/> Shrub <input type="checkbox"/> Tree <input type="checkbox"/>
	2. <u>Time to Maturity:</u> Typically, seed production peaks in August and then seedlings emerge in late spring. Seeds can germinate

	<p>within a few days and after about 4 months, the seedling is mature enough to produce viable seeds. However, plants that are vegetatively propagated are able to produce seeds within one month (4).</p> <p>3. <u>Length of Seed Viability</u>: Further investigation into the seed bank viability of the species needs to be completed; however, it is thought that the species has a seed dormancy of up to five years, though this could be affected by factors such as weathering and oxygen (7).</p> <p>4. <u>Methods of Reproduction</u>: Asexual <input checked="" type="checkbox"/> Sexual <input checked="" type="checkbox"/> <u>Notes</u>: The species is able to regenerate both vegetatively, through stolons, and from seeds. Stands of the species can produce upwards of 1,000 seeds per m² per year (4).</p> <p>5. <u>Hybridization potential</u>:</p>
II. Climate	<p>1. <u>Climate restrictions</u>: It grows exclusively in the understory and does not tolerate sunny conditions (4).</p> <p>2. <u>Effects of potential climate change</u>: Warmer temperatures could possibly expand the species' range north into more of Wisconsin (4).</p>
III. Dispersal Potential	<p>1. <u>Pathways - Please check all that apply</u>:</p> <p><u>Unintentional</u>: Bird <input checked="" type="checkbox"/> Animal <input checked="" type="checkbox"/> Vehicles/Human <input checked="" type="checkbox"/> Wind <input type="checkbox"/> Water <input type="checkbox"/> Other:</p> <p>There is no data to support that seeds are spread by birds, however, because the seeds are sticky they could potentially stick to the feathers and feet of birds (4).</p> <p><u>Intentional</u>: Ornamental <input type="checkbox"/> Forage/Erosion control <input type="checkbox"/> Medicine/Food: Other:</p> <p>2. <u>Distinguishing characteristics that aid in its survival and/or inhibit its control</u>: The awns produce a sticky substance, which allows the seeds to easily stick to animals, clothing, footwear, tires, and other objects (4).</p>
IV. Ability to go Undetected	<p>1. HIGH <input type="checkbox"/> MEDIUM <input checked="" type="checkbox"/> LOW <input type="checkbox"/> The species is similar in appearance to Japanese stiltgrass (<i>Microstegium vimineum</i>) (5).</p>
C. DAMAGE POTENTIAL	
I. Competitive Ability	<p>1. <u>Presence of Natural Enemies</u>: No</p> <p>2. <u>Competition with native species</u>: The ability of the plant to reproduce vegetatively as well as ability to invade undisturbed areas and shade out other plant species makes it very competitive (3, 4).</p> <p>2. <u>Rate of Spread</u>: -changes in relative dominance over time: -change in acreage over time: HIGH(1-3 yrs) <input checked="" type="checkbox"/> MEDIUM (4-6 yrs) <input type="checkbox"/> LOW (7-10 yrs) <input type="checkbox"/> Notes:</p>
II. Environmental Effects	<p>1. <u>Alteration of ecosystem/community composition?</u> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/></p>

	<p>Notes: Once the species has established, it crowds out native herbaceous plant species and prevents tree seedling establishment, eventually forming a monoculture of the species (4, 8). However, this species is fairly new in the U.S., therefore, its long-term ecological impacts are still relatively unknown (10).</p>
	<p>2. <u>Alteration of ecosystem/community structure?</u> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> Notes: Once the species becomes established, it prevents the regeneration of native hardwood tree species. Furthermore, it forms a dense layer in the forest understory and crowds out native herbaceous plants (4). However, this species is fairly new in the U.S., therefore, its long-term ecological impacts are still relatively unknown (10).</p>
	<p>3. <u>Alteration of ecosystem/community functions and processes?</u> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Notes: There is no evidence that the species alters the physical properties of the ecosystem (4). However, this species is fairly new in the U.S., therefore, its long-term ecological impacts are still relatively unknown (10).</p>
	<p>4. <u>Allelopathic properties?</u> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Notes: Although no studies have been conducted, from observations, other plants appear to grow with the species (i.e. <i>Microstegium vimineum</i>) and there is no evidence that any member of the <i>Oplismenus</i> genus is allelopathic (4).</p>
D. SOCIO-ECONOMIC EFFECTS	
I. Positive aspects of the species to the economy/society:	Notes:
II. Potential Socio-Economic Effects of Requiring Controls:	Positive: Negative:
III. Direct and indirect Socio-Economic Effects of Plant :	Notes: Some people do not want to visit infested areas and do activities such as dog walking, mountain biking, and hunting because the seeds stick to clothing, pets, and equipment. In Virginia, the species has been found in lawns as well (4).
IV. Increased Costs to Sectors Caused by the Plant::	Notes: n/a
V. Effects on human health:	Notes: None
VI. Potential socio-economic effects of restricting use:	Positive: Negative:
E. CONTROL AND PREVENTION	
I. Costs of Prevention (please be as specific as possible):	Notes: Education about the species and how to identify it is the primary prevention cost. Also, preventing the spread of the species is most effective by avoiding or closing off infested areas when the sticky seeds are present. Duct tape can be used to remove the seeds from clothing, but the tape must be destroyed (i.e.. burned) to prevent the possibility of seed spread (9).
II. Responsiveness to prevention efforts:	Notes: Because the species rapidly spreads, early detection and rapid response is necessary in preventing monocultures of large populations and in preventing the spread to new areas. If populations are detected and controlled quickly, the possibility for

	eradication exists (10).
III. Effective Control tactics: (provide only basic info)	Mechanical <input checked="" type="checkbox"/> Biological <input type="checkbox"/> Chemical <input checked="" type="checkbox"/> Times and uses: Because the species has shallow roots, it can be easily hand pulled, which is thought to be more effective than chemical treatment. Chemical treatment includes an application of 1-2% solution of glyphosate. Roundup works well late in the year, while a grass-specific herbicide is more effective early in the season (5, 7).
IV. Costs of Control:	Notes: Low, but it depends on the size of the population – large stands will require more people and hours to hand-pull and/or treat the population. Also, because the seeds can stick to almost anything, it is suggested that control efforts use separate clothing and gear when working in infested areas, then decontaminating before using those clothes and gear again (7). Finally, because <i>O. hirtellus ssp. undulatifolius</i> can form dense monocultures, after it has been eliminated, revegetation work will need to be completed to ensure other invasive species do not invade the newly cleared area.
V. Cost of prevention or control vs. Cost of allowing invasion to occur:	Notes: <i>O. hirtellus ssp. undulatifolius</i> is not present in WI and a relatively new invasive species in the United States. As a result, early implementation of prevention and control methods would result in lower eradication overall control costs.
VI. Non-Target Effects of Control:	Notes: Because glyphosate is a broad-spectrum herbicide, it can kill other native species growing with <i>O. hirtellus ssp. undulatifolius</i> . Likewise, a grass-specific herbicide is not specific to <i>O. hirtellus ssp. undulatifolius</i> and can kill surrounding non-target graminoid species.
VII. Efficacy of monitoring:	Notes: The species is very similar in appearance to Japanese stiltgrass (<i>Microstegium vimineum</i>), but it is possible to differentiate between the two species in the field (8). Furthermore, any sightings of the species should be reported immediately since the species is not present in WI.
VIII. Legal and landowner issues:	Notes: Cooperation with landowners for control efforts may be necessary.

F. HYBRIDS AND CULTIVARS AND VARIETIES

I. Known hybrids? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	Name of hybrid:
	Names of hybrid cultivars:
II. Species cultivars and varieties	<p>Names of cultivars, varieties and any information about the invasive behaviors of each:</p> <p>The variegated pink, green and white form, sold as <i>O. hirtellus</i> 'Variegatus' (Ribbon grass or basket grass), is an ornamental for hanging baskets. Under greenhouse conditions, it has spontaneously reverted to an all-green, wavy-leafed, aggressive form, though this reversion is questioned (11, 12, 6).</p> <p><i>Opismenus hirtellus ssp. undulatifolius</i> is not known to be cultivated. However, the closely related taxon, <i>O. hirtellus ssp. variegatus</i>, is sold as an ornamental grass by the horticulture</p>

industry, though this horticultural variety appears to be a hybrid and is believed to be sterile (4).

G. REFERENCES USED:

- UW Herbarium (Madison or Stevens Point)
- WI DNR
- Bugwood (Element Stewardship Abstracts)
- Native Plant Conservation Alliance
- IPANE
- USDA Plants

Number	Reference
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2	ISSG, ICUN. 2011. The Global Invasive Species Database (http://www.issg.org/database/ , 28 December 2011). Partners include National Biological Information Infrastructure, Manaaki Whenua-Landcare Research and the University of Auckland.
3	Virginia Department of Forestry. 2008. Accessed 04-25-2013. http://virginiaforests.blogspot.com/2008/11/wavyleaf-basket-grass-invasive-exotic.html
4	USDA Animal and Plant Health Inspection Service. 2012. Weed Risk Assessment for <i>Oplismenus hirtellus</i> (L.) P. Beauv. subsp. <i>undulatifolius</i> (Ard.) U. Scholz (Poaceae) – Wavyleaf basketgrass. Accessed 04-25-2013. http://www.pecva.org/library/documents/Land-Conservation/Managing-Your-Land/Remove-Invasive-Species/Wavyleaf-Basketgrass/usda_wavyleaf_report2012.pdf
5	Westbrooks, Randy G. U.S. National Early Detection and Rapid Response System for Invasive Plants EDRR Fact Sheet. Accessed 04-25-2013. http://delawareinvasives.net/yahoo_site_admin/assets/docs/Handout_7_-_Wavyleaf_Basketgrass.36175151.pdf
6	Global Invasive Species Database. 2010. <i>Oplismenus hirtellus</i> ssp. <i>undulatifolius</i> (grass). Accessed 04-25-2013. http://www.issg.org/database/species/ecology.asp?si=1557&lang=EN
7	Wavyleaf Basketgrass Task Force Meeting. 2009. Accessed 04-25-2013. http://www.fs.fed.us/ficmnew/documents/notices/WLBG_TaskForceMinutes_033109.pdf
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9	National Park Service. Invasive Exotic Plant Factsheet Wavyleaf basketgrass (<i>Oplismenus hirtellus</i> ssp. <i>undulatifolius</i>). Accessed 04-29-2013. http://www.nps.gov/shen/naturescience/upload/Wavyleaf_basketgrass_factsheet_aw.pdf
10	Pennsylvania Department of Conservation and Natural Resources. Invasive Plants in Pennsylvania Wavyleaf Basketgrass <i>Oplismenus hirtellus</i> spp. <i>Undulatifolius</i> . Accessed 04-29-2013. http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr_010307.pdf
11	Pohl, R.W. 1981. Reversion from variegated to green leaf glades in <i>Oplismenus hirtellus</i> (L.) Beauv. (Gramineae: Paniceae). Iowa State Journal of Research. Vol.56, No.2. pp. 177-179.
12	Kyde, Kerrie L. and Betty H. Marose. Wavyleaf Basketgrass in Maryland: An Early Detection Rapid Response Program in Progress. Accessed 04-25-2009. http://www.dnr.maryland.gov/wildlife/Plants_Wildlife/WLBG/pdfs/wlbg_poster011108.pdf

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