NEW YORK
NON-NATIVE PLANT INVASIVENESS RANKING FORM

Scientific name:	Vitex rotundifolia L.f.	USDA Plants Code: VIRO80
Common names:	Roundleaf chastetree, beach vitex, chasteberry, monk's pepper	
Native distribution:	Asia (China, Japan), India, Sri Lanka, Mauritius, Australia, Pacific Islands (inlcuding Hawaii)	
Date assessed:	3 June 2009; edited August 19, 2009	
Assessors:	Steve Glenn, Gerry Moore	
Reviewers:	LIISMA SRC	
Date Approved:	August 19, 2009	Form version date: 3 March 2009

New York Invasiveness Rank: High (Relative Maximum Score 70.00-80.00)

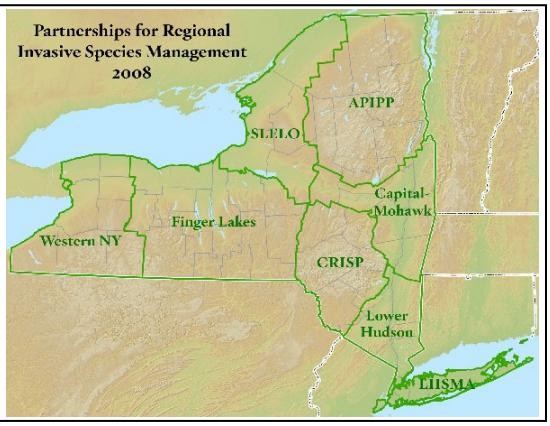
Distribution and Invasiveness Rank (*Obtain from PRISM invasiveness ranking form*)			
	Status of this species in each PRISM:	Current Distribution	PRISM Invasiveness Rank
1	Adirondack Park Invasive Program	Not Assessed	Not Assessed
2	Capital/Mohawk	Not Assessed	Not Assessed
3	Catskill Regional Invasive Species Partnership	Not Assessed	Not Assessed
4	Finger Lakes	Not Assessed	Not Assessed
5	Long Island Invasive Species Management Area	Not Present	Moderate
6	Lower Hudson	Not Assessed	Not Assessed
7	Saint Lawrence/Eastern Lake Ontario	Not Assessed	Not Assessed
8	Western New York	Not Assessed	Not Assessed

Invasiveness Ranking Summary (see details under appropriate sub-section)		Total (Total Answered*) Possible	Total
1	Ecological impact	40 (40)	37
2	Biological characteristic and dispersal ability	25 (25)	20
3	Ecological amplitude and distribution	25 (25)	4
4	Difficulty of control	10 (10)	8
	Outcome score	100 (100)[b]	73.00[a]
	Relative maximum score †		73.00
	New York Invasiveness Rank §	High (Relative Maximum Score 70.00-80.00)	

* For questions answered "unknown" do not include point value in "Total Answered Points Possible." If "Total Answered Points Possible" is less than 70.00 points, then the overall invasive rank should be listed as "Unknown."
†Calculated as 100(a/b) to two decimal places.
§Very High >80.00; High 70.00–80.00; Moderate 50.00–69.99; Low 40.00–49.99; Insignificant <40.00

A. DISTRIBUTION (KNOWN/POTENTIAL): Summarized from individual PRISM forms

A1.1. Has this species been documented to persist without cultivation in NY? (reliable source; voucher not required)	
☐	Yes – continue to A1.2
☒	No – continue to A2.1
A1.2. In which PRISMs is it known (see inset map)?	
☐	Adirondack Park Invasive Program
☐	Capital/Mohawk
☐	Catskill Regional Invasive Species Partnership
☐	Finger Lakes
☐	Long Island Invasive Species Management Area
☐	Lower Hudson
☐	Saint Lawrence/Eastern Lake Ontario
☐	Western New York



Documentation:
Sources of information:
Brooklyn Botanic Garden, 2009; Weldy & Werier, 2009; USDA, 2009.

A2.1. What is the likelihood that this species will occur and persist outside of cultivation, given the climate in the following PRISMs? (obtain from PRISM invasiveness ranking form)

Not Assessed	Adirondack Park Invasive Program
Not Assessed	Capital/Mohawk
Not Assessed	Catskill Regional Invasive Species Partnership
Not Assessed	Finger Lakes
Very Likely	Long Island Invasive Species Management Area
Not Assessed	Lower Hudson
Not Assessed	Saint Lawrence/Eastern Lake Ontario
Not Assessed	Western New York

Documentation: Native to beach communities as far north as China-Liaoning Province (Zheng & Raven, 1994); Korea- Ulleung-do (Gyeongsangbuk-do) Province (Flora of Korea Editorial Committee, 2007); and Japan- Honshu (Iwatsuki et al., 1993). True (2009) concludes "Based on native habitat and hardiness, beach vitex can grow in eastern coastal zones as far north as Rhode Island." Based on native habitat, the Long Island PRISM is the most vulnerable of all NY PRISMs to invasion by this species
Sources of information (e.g.: distribution models, literature, expert opinions):
Iwatsuki et al., 1993; Zheng & Raven, 1994;Flora of Korea Editorial Committee, 2007; True, 2009.

If the species does not occur and is not likely to occur with any of the PRISMs, then stop here as there is no need to assess the species.

A2.2. What is the current distribution of the species in each PRISM? (obtain rank *from PRISM invasiveness ranking forms*)

	Distribution
Adirondack Park Invasive Program	Not Assessed
Capital/Mohawk	Not Assessed
Catskill Regional Invasive Species Partnership	Not Assessed
Finger Lakes	Not Assessed
Long Island Invasive Species Management Area	Not Present
Lower Hudson	Not Assessed
Saint Lawrence/Eastern Lake Ontario	Not Assessed
Western New York	Not Assessed

Documentation:
Sources of information:
Brooklyn Botanic Garden, 2009; Weldy & Werier, 2009.

A2.3. Describe the potential or known suitable habitats within New York. Natural habitats include all habitats not under active human management. Managed habitats are indicated with an asterisk.

Aquatic Habitats	Wetland Habitats	Upland Habitats
☐ Salt/brackish waters	☐ Salt/brackish marshes	☐ Cultivated*
☐ Freshwater tidal	☐ Freshwater marshes	☐ Grasslands/old fields
☐ Rivers/streams	☐ Peatlands	☐ Shrublands
☐ Natural lakes and ponds	☐ Shrub swamps	☐ Forests/woodlands
☐ Vernal pools	☐ Forested wetlands/riparian	☐ Alpine
☐ Reservoirs/impoundments*	☐ Ditches*	☐ Roadsides*
	☒ Beaches and/or coastal dunes	

Other potential or known suitable habitats within New York:

Documentation:
Sources of information:
Iwatsuki et al., 1993; Zheng & Raven, 1994;Flora of Korea Editorial Committee, 2007; Maybury, 2007;

True, 2009.

B. INVASIVENESS RANKING

Questions apply to areas similar in climate and habitats to New York unless specified otherwise.

1. ECOLOGICAL IMPACT

1.1. Impact on Natural Ecosystem Processes and System-Wide Parameters (e.g. fire regime, geomorphological changes (erosion, sedimentation rates), hydrologic regime, nutrient and mineral dynamics, light availability, salinity, pH)

A.	No perceivable impact on ecosystem processes based on research studies, or the absence of impact information if a species is widespread (>10 occurrences in minimally managed areas), has been well-studied (>10 reports/publications), and has been present in the northeast for >100 years.	0
B.	Influences ecosystem processes to a minor degree (e.g., has a perceivable but mild influence on soil nutrient availability)	3
C.	Significant alteration of ecosystem processes (e.g., increases sedimentation rates along streams or coastlines, reduces open water that are important to waterfowl)	7
D.	Major, possibly irreversible, alteration or disruption of ecosystem processes (e.g., the species alters geomorphology and/or hydrology, affects fire frequency, alters soil pH, or fixes substantial levels of nitrogen in the soil making soil unlikely to support certain native plants or more likely to favor non-native species)	10
U.	Unknown	

Score: 10

Documentation:
Identify ecosystem processes impacted (or if applicable, justify choosing answer A in the absence of impact information)
May significantly change dune morphology/dynamics. Even though species was imported and planted for dune stabilization, it is not as efficient in dune building and stabilization as native dune plant species, beach vitex being less efficient at trapping wind-blown sands. As a result lower dune profiles have been observed where beach vitex has been observed. Also greatly reduces light levels at surface level.
Sources of information:
Maybury, 2007; NISIC, 2009; True, 2009.

1.2. Impact on Natural Community Structure

A.	No perceived impact; establishes in an existing layer without influencing its structure	0
B.	Influences structure in one layer (e.g., changes the density of one layer)	3
C.	Significant impact in at least one layer (e.g., creation of a new layer or elimination of an existing layer)	7
D.	Major alteration of structure (e.g., covers canopy, eradicating most or all layers below)	10
U.	Unknown	

Score: 10

Documentation:
Identify type of impact or alteration:
Forms a significanly denser layer of vegetation than native dune species with "impenetrable, wiry roots"; reportedly to greatly reduce soil surface light levels. Can result in a woody layer where on did not exist..
Sources of information:
Maybury, 2007; True, 2009.

1.3. Impact on Natural Community Composition

A.	No perceived impact; causes no apparent change in native populations	0

B.	Influences community composition (e.g., reduces the number of individuals in one or more native species in the community)	3
C.	Significantly alters community composition (e.g., produces a significant reduction in the population size of one or more native species in the community)	7
D.	Causes major alteration in community composition (e.g., results in the extirpation of one or several native species, reducing biodiversity or change the community composition towards species exotic to the natural community)	10
U.	Unknown	

Score: 10

Documentation:
Identify type of impact or alteration:
Displaces native vegetation, including the federally-threatened sea beach amaranth (Amaranthus pumilus), although most populations of A. pumilus are found on the beaches in fron of the dune complexes. .
Sources of information:
Maybury, 2007; NISIC, 2009; True, 2009.

1.4. Impact on other species or species groups (cumulative impact of this species on the animals, fungi, microbes, and other organisms in the community it invades. Examples include reduction in nesting/foraging sites; reduction in habitat connectivity; injurious components such as spines, thorns, burrs, toxins; suppresses soil/sediment microflora; interferes with native pollinators and/or pollination of a native species; hybridizes with a native species; hosts a non-native disease which impacts a native species)

A.	Negligible perceived impact	0
B.	Minor impact	3
C.	Moderate impact	7
D.	Severe impact on other species or species groups	10
U.	Unknown	

Score: 7

Documentation:
Identify type of impact or alteration:
The dense mats of beach Vitex degrade the nesting habitat of the federally threatened loggerhead sea turtle and native water birds (e.g., piping plovers). Turtle conservationists fear that nesting turtles will be unable to dig through the thick vegetation and deep roots to lay their eggs. SRC determined that the impact was not major since the species affected primarily nest on the beach and toes of the dunes and not on the dunes themselves.
Sources of information:
Maybury, 2007; NISIC, 2009; True, 2009.

Total Possible: 40
Section One Total: 37

2. BIOLOGICAL CHARACTERISTICS AND DISPERSAL ABILITY

2.1. Mode and rate of reproduction (provisional thresholds, more investigation needed)

A.	No reproduction by seeds or vegetative propagules (i.e. plant sterile with no sexual or asexual reproduction).	0
B.	Limited reproduction (fewer than 10 viable seeds per plant AND no vegetative reproduction; if viability is not known, then maximum seed production is less than 100 seeds per plant and no vegetative reproduction)	1
C.	Moderate reproduction (fewer than 100 viable seeds per plant - if viability is not known, then maximum seed production is less than 1000 seeds per plant - OR limited successful vegetative spread documented)	2

D. Abundant reproduction with vegetative asexual spread documented as one of the plants prime reproductive means OR more than 100 viable seeds per plant (if viability is not known, then maximum seed production reported to be greater than 1000 seeds per plant.) 4

U. Unknown

Score 4

Documentation:
Describe key reproductive characteristics (including seeds per plant):
Copious seed production- one study reported an average of 2,730 fruits per square meter, with a maximum of 5,580 fruits per square meter; with each fruit produces on average 1.25 viable seeds. Also produces long runners that root at multiple nodes, and reproduction via stem fragmentation (True, 2009).
Sources of information:
True, 2009.

2.2. Innate potential for long-distance dispersal (e.g. bird dispersal, sticks to animal hair, buoyant fruits, pappus for wind-dispersal)

A. Does not occur (no long-distance dispersal mechanisms) 0

B. Infrequent or inefficient long-distance dispersal (occurs occasionally despite lack of adaptations) 1

C. Moderate opportunities for long-distance dispersal (adaptations exist for long-distance dispersal, but studies report that 95% of seeds land within 100 meters of the parent plant) 2

D. Numerous opportunities for long-distance dispersal (adaptations exist for long-distance dispersal and evidence that many seeds disperse greater than 100 meters from the parent plant) 4

U. Unknown

Score 4

Documentation:
Identify dispersal mechanisms:
Water (hydrochory) and animal (epizoochory). Once found on an undeveloped beach 2.6 km from the closest planted population.
Sources of information:
True, 2009.

2.3. Potential to be spread by human activities (both directly and indirectly – possible mechanisms include: commercial sales, use as forage/revegetation, spread along highways, transport on boats, contaminated compost, land and vegetation management equipment such as mowers and excavators, etc.)

A. Does not occur 0

B. Low (human dispersal to new areas occurs almost exclusively by direct means and is infrequent or inefficient) 1

C. Moderate (human dispersal to new areas occurs by direct and indirect means to a moderate extent) 2

D. High (opportunities for human dispersal to new areas by direct and indirect means are numerous, frequent, and successful) 3

U. Unknown

Score 2

Documentation:
Identify dispersal mechanisms:
Originally introduced for beach stabilization and recommended and sold for southeastern United States coastal landscapes; now banned in many areas. Seeds could be moved by humans indirectly if attached to clothes. Introduction to new areas could occur through beach replenishment if seeds can survive being offshore, the source of sand for most beach replenishment projects.
Sources of information:

Maybury, 2007; True, 2009.

2.4. Characteristics that increase competitive advantage, such as shade tolerance, ability to grow on infertile soils, perennial habit, fast growth, nitrogen fixation, allelopathy, etc.

A. Possesses no characteristics that increase competitive advantage 0
B. Possesses one characteristic that increases competitive advantage 3
C. Possesses two or more characteristics that increase competitive advantage 6
U. Unknown

Score 6

Documentation:
Evidence of competitive ability:
Perennial, allelopathic, grows on infertile soils.
Sources of information:
True, 2009.

2.5. Growth vigor

A. Does not form thickets or have a climbing or smothering growth habit 0
B. Has climbing or smothering growth habit, forms a dense layer above shorter vegetation, forms dense thickets, or forms a dense floating mat in aquatic systems where it smothers other vegetation or organisms 2
U. Unknown

Score 2

Documentation:
Describe growth form:
Forms dense thickets.
Sources of information:
True, 2009.

2.6. Germination/Regeneration

A. Requires open soil or water and disturbance for seed germination, or regeneration from vegetative propagules. 0
B. Can germinate/regenerate in vegetated areas but in a narrow range or in special conditions 2
C. Can germinate/regenerate in existing vegetation in a wide range of conditions 3
U. Unknown (No studies have been completed)

Score 2

Documentation:
Describe germination requirements:
One study germination rates of of 71% in the laboratory and 30% in sea sand with no difference between dry and moist stratification; but germination in the context of disturbance was not addressed. Generally becomes established on dunes -- an inherently disturbed system -- with little to no vegetation. Regeneration can readilyoccur in existing areas.
Sources of information:
ChongMin & Eulsoo, 2001

2.7. Other species in the genus invasive in New York or elsewhere

A. No 0
B. Yes 3
U. Unknown

Score 0

Documentation:
Species:
No reports of any Vitex escaping in New York. One report of Vitex agnus-castus escaping in

New Jersey (Brooklyn Botanic Garden, 2009). Vitex agnus-castus also reported escaping in MD, PA, VA, and southward (USDA, 2009). Vitis negundo reported escaping in MD and OH (USDA, 2009). The invasive status of these other Vitex spp. is undetermined. None are invasive.

Brooklyn Botanic Garden, 2009; U.S.D.A., 2009; Weldy & Werier, 2009.

Total Possible	25
Section Two Total	20

3. ECOLOGICAL AMPLITUDE AND DISTRIBUTION

3.1. Density of stands in natural areas in the northeastern USA and eastern Canada (use same definition as Gleason & Cronquist which is: "The part of the United States covered extends from the Atlantic Ocean west to the western boundaries of Minnesota, Iowa, northern Missouri, and southern Illinois, south to the southern boundaries of Virginia, Kentucky, and Illinois, and south to the Missouri River in Missouri. In Canada the area covered includes Nova Scotia, Prince Edward Island, New Brunswick, and parts of Quebec and Ontario lying south of the 47th parallel of latitude")

A.	No large stands (no areas greater than 1/4 acre or 1000 square meters)	0
B.	Large dense stands present in areas with numerous invasive species already present or disturbed landscapes	2
C.	Large dense stands present in areas with few other invasive species present (i.e. ability to invade relatively pristine natural areas)	4
U.	Unknown	

Score: 0

Documentation:
Identify reason for selection, or evidence of weedy history:
No populations reported in the Northeast.
Sources of information:
Maybury, 2007; Brooklyn Botanic Garden, 2009; True, 2009.

3.2. Number of habitats the species may invade

A.	Not known to invade any natural habitats given at A2.3	0
B.	Known to occur in two or more of the habitats given at A2.3, with at least one a natural habitat.	1
C.	Known to occur in three or more of the habitats given at A2.3, with at least two a natural habitat.	2
D.	Known to occur in four or more of the habitats given at A2.3, with at least three a natural habitat.	4
E.	Known to occur in more than four of the habitats given at A2.3, with at least four a natural habitat.	6
U.	Unknown	

Score: 1

Documentation:
Identify type of habitats where it occurs and degree/type of impacts:
See A2.3.
Sources of information:
Iwatsuki et al., 1993; Zheng & Raven, 1994;Flora of Korea Editorial Committee, 2007; Maybury, 2007; True, 2009.

3.3. Role of disturbance in establishment

A.	Requires anthropogenic disturbances to establish.	0

B. May occasionally establish in undisturbed areas but can readily establish in areas with natural or anthropogenic disturbances. 2
C. Can establish independent of any known natural or anthropogenic disturbances. 4
U. Unknown

Score 2

Documentation:
Identify type of disturbance:
Its native habitat is coastal beach areas, a habitat with inherent natural disturbance.
Sources of information:
Iwatsuki et al., 1993; Zheng & Raven, 1994;Flora of Korea Editorial Committee, 2007; True, 2009.

3.4. Climate in native range

A. Native range does not include climates similar to New York 0
B. Native range possibly includes climates similar to at least part of New York. 1
C. Native range includes climates similar to those in New York 3
U. Unknown

Score 1

Documentation:
Describe what part of the native range is similar in climate to New York:
Native to in Asia as far north as China-Liaoning Province (Zheng & Raven, 1994); Korea-Ulleung-do (Gyeongsangbuk-do) Province (Flora of Korea Editorial Committee, 2007); and Japan- Honshu (Iwatsuki et al., 1993). True (2009): "Based on native habitat and hardiness, beach vitex can grow in eastern coastal zones as far north as Rhode Island." Species in the genus Vitex in general are not or are barely cold hardy in the Northeast. More study needed to determine if species could survive in New York. SRC doubts that species would survive on dunes in the Great Lakes due to the colder climate.
Sources of information:
Iwatsuki et al., 1993; Zheng & Raven, 1994;Flora of Korea Editorial Committee, 2007; True, 2009.

3.5. Current introduced distribution in the northeastern USA and eastern Canada (see question 3.1 for definition of geographic scope)

A. Not known from the northeastern US and adjacent Canada 0
B. Present as a non-native in one northeastern USA state and/or eastern Canadian province. 1
C. Present as a non-native in 2 or 3 northeastern USA states and/or eastern Canadian provinces. 2
D. Present as a non-native in 4–8 northeastern USA states and/or eastern Canadian provinces, and/or categorized as a problem weed (e.g., “Noxious” or “Invasive”) in 1 northeastern state or eastern Canadian province. 3
E. Present as a non-native in >8 northeastern USA states and/or eastern Canadian provinces. and/or categorized as a problem weed (e.g., “Noxious” or “Invasive”) in 2 northeastern states or eastern Canadian provinces. 4
U. Unknown

Score 0

Documentation:
Identify states and provinces invaded:
No populations reported from the Northeast.
Sources of information: See known introduced range in plants.usda.gov, and update with information from states and Canadian provinces.
True, 2009; U.S.D.A., 2009.

3.6. Current introduced distribution of the species in natural areas in the eight New

York State PRISMs (Partnerships for Regional Invasive Species Management)

A.	Present in none of the PRISMs	0
B.	Present in 1 PRISM	1
C.	Present in 2 PRISMs	2
D.	Present in 3 PRISMs	3
E.	Present in more than 3 PRISMs or on the Federal noxious weed lists	4
U.	Unknown	

Score: 4

Documentation:
Describe distribution:
No records of this species in NY to date. However the species is a candidate for the federal noxious weed list, which is rarely updated. We anticipate that it will be added.
Sources of information:
Brooklyn Botanic Garden, 2009; Weldy & Werier, 2009.

Total Possible: 25
Section Three Total: 8

4. DIFFICULTY OF CONTROL

4.1. Seed banks

A.	Seeds (or vegetative propagules) remain viable in soil for less than 1 year, or does not make viable seeds or persistent propagules.	0
B.	Seeds (or vegetative propagules) remain viable in soil for at least 1 to 10 years	2
C.	Seeds (or vegetative propagules) remain viable in soil for more than 10 years	3
U.	Unknown	

Score: 2

Documentation:
Identify longevity of seed bank:
One study stated "the soil seed bank of beach vitex is persistent and will repopulate cleared areas"; but viability duration not stated. Genus in general known to have seeds that survive for longer than a year; no evidence for survival longer than 10 years.
Sources of information:
True, 2009; Shopmeyer 1974.

4.2. Vegetative regeneration

A.	No regrowth following removal of aboveground growth	0
B.	Regrowth from ground-level meristems	1
C.	Regrowth from extensive underground system	2
D.	Any plant part is a viable propagule	3
U.	Unknown	

Score: 2

Documentation:
Describe vegetative response:
Produces long runners that root at multiple nodes, and reproduction via stem fragmentation.
Sources of information:
True, 2009.

4.3. Level of effort required

A.	Management is not required: e.g., species does not persist without repeated anthropogenic disturbance.	0

B.	Management is relatively easy and inexpensive: e.g. 10 or fewer person-hours of manual effort (pulling, cutting and/or digging) can eradicate a 1 acre infestation in 1 year (infestation averages 50% cover or 1 plant/100 ft^2).	2
C.	Management requires a major short-term investment: e.g. 100 or fewer person-hours/year of manual effort, or up to 10 person-hours/year using mechanical equipment (chain saws, mowers, etc.) for 2-5 years to suppress a 1 acre infestation. Eradication is difficult, but possible (infestation as above).	3
D.	Management requires a major investment: e.g. more than 100 person-hours/year of manual effort, or more than 10 person hours/year using mechanical equipment, or the use of herbicide, grazing animals, fire, etc. for more than 5 years to suppress a 1 acre infestation. Eradication may be impossible (infestation as above).	4
U.	Unknown	

Score: 4

Documentation:
Identify types of control methods and time-term required:

Plant occurs in a protected system (dunes) making eradication quite difficult. Herbicide that is effective, imazapyr, is banned New York. Following protocols are from Truw (2009): Chemical: Beach vitex control at 1 month after treatment (MAT) was greatest with glyphosate and glyphosate plus imazapyr (73% to 84%) and at 12 MAT, control increased to 90 and 94%, respectively. Control with triclopyr mixtures was less than 36% at 1 MAT and less than 11% at 12 MAT. In a second experiment, at 1 MAT glyphosate, imazapyr, and metsulfuron controlled beach vitex 66 to 82%. Control with aminopyralid, imazamox, and penoxsulam was less than 50%. At 8 MAT greatest control was observed with glyphosate and imazapyr (83 and 90%, respectively). Control levels with other treatments were significantly lower at 19 to 52%. In a greenhouse study at 3 weeks after treatment (WAT), control was 37 to 68% with glyphosate and 41 to 76% with imazapyr. At 5 WAT, control was 34 to 87% with glyphosate and 48 to 95% with imazapyr. Dry weight was 4.47 to 5.00 g in glyphosate treatments and 3.50 to 6.18 in imazapyr treatments as compared to the nontreated dry weight of 6.93 g. The absorption and translocation of glyphosate in beach vitex was evaluated with cut stem and foliar applications. Plants were treated with a prepared 14C-glyphosate solution and harvested at 6, 24, 48, 92, and 196 hours after treatment (HAT). In beach vitex cut stems, time of harvest was not significant indicating that all absorption and translocation occurred within the first six hours after treatment. The greatest amount of herbicide recovered remained in the stump (348,408 DPM). A moderate amount translocated to the first root section (14,572 DPM) and a minimal amount translocated to root segments greater distances from the stump (1,657 and 617 DPM for second 10 cm of roots and end roots, respectively). In foliar treatments, the greatest recovered herbicide remained in the treated leaf at 17,828 DPM. Recovered 14C-glyphosate in other plant parts did not differ and ranged 1,222 to 4,300 DPM. At 6 and 24 HAT, 2,081 to 2,825 DPM were recovered. Greater amounts of 6,432 to 9,661 were recovered at 48 to 196 HAT. Translocation of the applied herbicide was generally low with both application methods.
Sources of information:
True, 2009.

Total Possible	10
Section Four Total	8
Total for 4 sections Possible	100
Total for 4 sections	73

C. STATUS OF CULTIVARS AND HYBRIDS:

At the present time (May 2008) there is no protocol or criteria for assessing the invasiveness of cultivars independent of the species to which they belong. Such a protocol is needed, and individuals with the appropriate expertise should address this issue in the future. Such a protocol will likely require data on cultivar fertility and identification in both experimental and natural settings.

Hybrids (crosses between different parent species) should be assessed individually and separately from the parent species wherever taxonomically possible, since their invasiveness may differ from that of the parent species. An exception should be made if the taxonomy of the species and hybrids are uncertain, and species and hybrids can not be clearly distinguished in the field. In such cases it is not feasible to distinguish species and hybrids, and they can only be assessed as a single unit.

Some cultivars of the species known to be available:

References for species assessment:

Brooklyn Botanic Garden. 2009. AILANTHUS database. [Accessed on 3 June 2009].

ChongMin, P. & P. Eulsoo. 2001. Growing characteristics and propagation of Vitex rotundifolia for development of rehabilitation plant in seaboard area. Korean Journal of Environment and Ecology 15:57-68. (abstract)

Flora of Korea Editorial Committee. 2007. The genera of vascular plants of Korea. Academy Publ. Co., Seoul, Korea. 1482 pp.

Iwatsuki, K., T. Yamazaki, D. E. Boufford, & H. Ohba (eds.). 1993. Flora of Japan. Vol. IIIa. Kodansha Ltd., Tokyo, Japan. 482 pp.

Maybury, K. 2007. Vitex rotundifolia. U.S. Invasive Species Impact Rank (I-Rank). NatureServe Explorer. <www.natureserve.org>. [Accessed on 3 June 2009].

National Invasive Species Information Center. 2009. Beach vitex (Vitex rotundifolia). Online: <invasivespeciesinfo.gov/plants/beachvitex.html>. [Accessed 3 June 2009.]

Schopmeyer, C.S. 1974. Vitex agnus-castus L. Lilac chasetree. In:Schopmeyer. Tech. coord. Seeds of woody plants in the United States. Agric. Handbook 450. Washingon, DC. USDA Forest Service: 851-852.

True, S. L. 2009. The biology and control of beach vitex (Vitex rotundifolia) and common reed (Phragmites australis). MS Thesis, North Carolina Univ., Raleigh, NC. 83 pp.

United States Department of Agriculture, National Resources Conservation Service. 2009. The PLANTS Database. National Plant Data Center, Baton Rouge, Louisiana [Accessed on 3 June 2009].

Weldy, T. & D. Werier. 2009. New York Flora Atlas. [S. M. Landry and K. N. Campbell (original application development), Florida Center for Community Design and Research. University of South Florida]. New York Flora Association, Albany, New York. [Accessed on 3 June 2009].

Zheng, W. & P. H. Raven (eds.). 1994. Flora of China. Vol. 17. Missouri Botanic Garden, St. Louis, MO. 378 pp.

Citation: This NY ranking form may be cited as: Jordan, M.J., G. Moore and T.W. Weldy. 2008. Invasiveness ranking system for non-native plants of New York. Unpublished. The Nature Conservancy, Cold Spring Harbor, NY; Brooklyn Botanic Garden, Brooklyn, NY; The Nature Conservancy, Albany, NY. Note that the order of authorship is alphabetical; all three authors contributed substantially to the development of this protocol.

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References for ranking form:

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