Southern Nursery Association

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SNA RESEARCH CONFERENCE - VOL. 50 - 2005

History of Beach Vitex Cultivation: A Potential Invasive Ornamental

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Index Words: *Vitex rotundifolia* L.f., Invasive Plants, Sea beach amaranth

Significance to Industry: Plant material available in ornamental plant nurseries of the southeastern United States is predominantly composed of introduced, non-native species. The introduction of new plant species have contributed greatly towards increasing the landscape plant diversity and aesthetics of our urban landscapes. A vast majority of introductions have had little impact on natural plant communities of the Southeast. However, a small percentage of introductions have become invasive species, i.e. capable of surviving and reproducing outside of cultivation and establishing within the local flora. Between 50 and 85% of invasive plant species in the United States were introduced for either ornamental or landscape use (1, 4). The introduction and cultivation of beach vitex (*Vitex rotundifolia*) is detailed here in order to demonstrate the convoluted nature of "new" plant introduction, and the need for arboreta and nurseries to improve plant evaluation programs with regards to screening invasive potential.

Ecology, Taxonomy, and Cultivation: Beach vitex, or roundleaf vitex, is a woody sub-shrub with a sprawling, or vine-like habit that spreads vegetatively via adventitious rooting of prostrate stems. It is native across a broad range of the western Pacific: north to Korea, Japan and China; through SE Asia, the Malay Peninsula, south to Australia; west to India and throughout the Pacific islands as far east as Hawaii (www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?41839). As the name implies, beach vitex is found growing in coastal habitats, along sandy and rocky shorelines and dunes where it is a dominant member of the shrub zone and is often the last plant found growing before the tidal zone (2). It is a member of the Verbenaceae, a taxonomically broad family which includes approximately 250 species of Vitex (6). At least two other species of *Vitex* are common in the nursery trade, *V. agnus-castus* L. (chastetree) and *V. trifolia* L.(Indian three-leaf vitex). Beach vitex is root hardy through USDA zone 6b (-5°F; -20.5C°) and extremely heat-tolerant, thus capable of surviving throughout coastal regions of the eastern U.S. from Texas to Rhode Island, and the entire west coast of the U.S. from California to Washington.

Introduction of Beach Vitex: Among nurserymen and plantsmen in the Southeast, the introduction of beach vitex to the U.S. has been attributed to the N.C. State University Arboretum [now the J.C. Raulston Arboretum (JCRA) (Raleigh, NC 27695-7522)]. This assumption stems from the 1985 U.S. National Arboretum (USNA) (Washington, D. C. 20002-1958) sponsored plant collecting expedition to the Republic of Korea, which Dr. J.C. Raulston, then director of the arboretum, was a participant in as chronicled in the newsletters of the JCRA (3). During

the expedition, beach vitex was found growing in the vicinity of Wando Island (SW Korea ≈ 34°21' N, 126°41'E) as "a mat forming, creeping shrub with silvery aromatic leaves and showy blue flowers producing extensive colonies on sand and shingle at high tide line" [Newsletter no. 17, 1987 (3)]. Collections from this site were accessioned in 1985 by the USNA as NA 56730.

The only Korean record of *V. rotundifolia* at the JCRA from the USNA is NA 55280 from a USNA 1984 collection from Chollipo, Korea. The fate of NA 55280, however, at the JCRA is unknown, as no plants exist in the current living collections from this accession. However the species was already growing at the JCRA, having been accessioned in 1978 as cuttings from the USNA with no accompanying accession number or provenance. This early accession is referenced in the arboretum newsletter in a listing of plants killed or injured during severe winter weather of 1982 [no. 5, 1982 (3)]. The exact origin of these accessions from the USNA is unknown, as there are no records of cuttings distributed to the JCRA at that time (Kevin Conrad, USNA; pers. comm.).

This raises the question as to when and where *V. rotundifolia* was first introduced to the U.S. The Germplasm Resources Information Network (GRIN) of the U.S. Department of Agriculture's Agricultural Research Service is a web server providing a searchable database of germplasm available within the USDA system (www.ars-grin.gov/). Within GRIN, there are four accessions of *V. rotundifolia* (NA 54672, NA 55280, NA 56730, and NA 66619), all of which originate from Korean germplasm during a period from 1984 to 1993. Of these accessions, two are still available including NA 55280 accessioned by the JCRA in 1986 and NA 56730 from the Wando population. No records of pre-1984 accessions for *V. rotundifolia* are present within the GRIN system.

Prior to 1980, the Arnold Arboretum (AA) (Jamaica Plain, MA 02130-3500) made a collection trip to the same area of Korea (Chollipo) that later USNA expeditions visited. The 1977 Japan-Korea Plant Exploration trip made over 500 collections, including seeds from a natural population of *V. rotundifolia* growing at Chollipo (AA 1800-77) (5). However, there is no record of this accession having been distributed by the AA (Jack Alexander, AA; pers. comm.), and no plants are extant in the AA collections. However, the AA has one earlier accession of *V. rotundifolia* that came from the USNA in 1969 as PI 317312. No details accompany the accession data for this PI.

To access pre-1984 USNA accessions, the earliest handwritten files were reviewed by Kevin Conrad (USNA), revealing that the USNA had two earlier accessions of *V. rotundifolia*, in 1961 and 1955. In 1961, the USNA accessioned PI 271881 as seeds obtained from the Osaka Botanic Garden in Japan via index seminum. The earliest record at the USNA, and the proposed earliest date of introduction for *V. rotundifolia*, is 1955 when PI 227655 was accessioned, representing a collection made by Dr. John Creech from Japan.

Evaluations and Spread: The introduction of beach vitex into the U.S. occurred as long ago as 1955 via the USNA. In the following decades, it was introduced at least six times, by two different institutions (not including the JCRA whose first and subsequent accessions originated at the USNA). It is not clear to what

extent these early accessions were grown, either within the given institutions, or distributed to cooperators (i.e. other botanical gardens, arboreta, nurseries, etc.). By 1978, beach vitex was growing and being evaluated in North Carolina at the JCRA. By 1985, at the time of the USNA Korean expedition, it appears that beach vitex was still rare in North American gardens and not available within the nursery industry [Newsletter no. 14, 1986 (3)]. After 1985, beach vitex was promoted as a landscape plant for coastal areas of the southeastern U.S. [Newsletter no. 14, 1986 (3)]. Thus, it appears that by the late 1980's, beach vitex was available in the nursery industry for landscapers and the general public. Although the plant had performed well at the JCRA, there appears to have been no evaluations of beach vitex in coastal landscapes to further evaluate performance or invasiveness in coastal habitats of the southern U.S. By the mid-1990's, beach vitex was observed spreading from original seaside plantings into natural dune areas (www.beachvitex.org). By 2003, further observations and identifications of new infestations impacting endangered sea turtle and sea beach amaranth (*Amaranthus pumilus* Rafinesque) habitats (Dale Suiter, US Fish and Wildlife; pers. comm.), led to the creation of the S.C and NC. Beach Vitex Task Forces. Together the two groups administer (www.beachvitex.org), a website dedicated to disseminating information and educating the public on the spread of beach vitex.

With increased public awareness regarding the impact of invasive species on biodiversity, and recent legislation in some states banning the production and sale of invasive woody landscape plants, it has become imperative that the nursery industry take a pro-active response to the role it plays in the spread of invasive plants. As a first step, it is recommended that nurseries evaluate and remove from production those species that have shown invasive tendencies within their local or regional ecosystems (4). Although beach vitex has not been legally classified as a noxious or invasive plant species, it is a species of concern for both S.C and N.C. Nurseries in both states, should consider removing beach vitex from production, until there is sufficient data clarifying the extent of invasive potential, and develop or promote less invasive alternatives.

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