Vitex rotundifolia 简体中文 正體中文

System: Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Magnoliophyta	Magnoliopsida	Lamiales	Verbenaceae

Common name

dan ye man jing (Chinese, China), roundleaf chastetree (English), single-leaf chaste tree (English), kolokolo kahakai (Hawaiian, Hawaii), chasteberry (English), pohinahina (Hawaiian, Hawaii), mawanawana (Hawaiian, Hawaii), beach vitex (English), polinalina (Hawaiian, Hawaii), hinahina kolo (Hawaiian, Hawaii), man hyung ja (English, Korea), manawanawa (Hawaiian, Hawaii), cloister pepper (English), monk's pepper (English), hamago (English, Japan)

Synonym

Vitex ovata , (Thunb.)
Vitex trifolia , var. *simplicifolia* (Cham.)
Vitex agnus-castus , var. *ovata* (Thunb.) Makino
Vitex trifolia , subsp. *litoralis* Steenis
Vitex trifolia , var. *obovata* Bentham
Vitex trifolia , var. *ovata* (Thunb.) Makino
Vitex trifolia , var. *ovata* (Thunb.) Merrill
Vitex trifolia , var. *unifoliata* Schauer
Vitex trifolia , var. *repens* Ridley
Vitex repens , Blanco

Similar species

Amaranthus pumilus, Cakile edentula ssp. harperi, Croton punctatus, Iva frutescens, Iva imbricata, Morella cerifera

Summary

Vitex rotundifolia, also commonly known as beach vitex, is a perennial woody shrub of coastal sand dunes of Asia and the Pacific islands. It has been introduced into the United States where it is an invasive exotic plant. Vitex rotundifolia has a strong impact on the native flora and fauna along the United States Carolina coast, shading native plants and disrupting nesting sites for sea turtles. Active community involvement and strategic mapping and eradication efforts are underway to limit the extent and impact that this exotic species has on the coasts of the Carolinas and prevent it from spreading into a wider geographical range.

view this species on IUCN Red List

Species Description
Vitex rotundifolia is a branched deciduous shrub (Westbrooks and Brabson, 2007) that can reach heights between 0.5-1 metres and have horizontal growth up to 20m long, but more commonly has a width around 5 metres (GRI, 2006). According to Westbrooks and Brabson (2007), the \"branchlets are obscurely tetrangular, tomentose, stems procumbent, often rooting at the nodes, forming mats several metres in diameter, 1-3dm long\". The leaves are simple obovate to suborbicular, 2-6.5cm long, 1-4.5cm wide, and an acute base. The upper surface of the leaf is pale green and densely puberulent with a greyish-white lower surface. The lower surface of the leaf is also densely tomentose, short petiolate, and apex rounded (Westbrooks and Brabson, 2007). The foliage has a spicy fragrance when crushed (HNPPD, 2001). The flowers are arranged in terminal clusters in panicles, and about 2cm long (Gresham & Neal, undated; HNPPD, 2001). The corolla is bluish-purple, densely puberulent externally, with the tube about 8mm long. The upper two lobes are 3.5mm long with the margins recurved. The lateral lobe is about 4mm long and the lower lobe is about 7mm long. The base of the lower lobe is marked by two white pilose. The stamen is esxerted from the corolla. The filaments are 9-10mm long and pilose at base. The style is also exserted from the corolla and is about 12mm long. The fruit consists of a dry, globose drupe, and is about 6mm in diameter. During September-October the fruit turns from green into yellow and red-tinged. At maturity the fruit is bluish-black (Westbrooks and Brabson, 2007).

Notes
Vitex rotundifolia was introduced to the southeastern United States from Korea by North Carolina State University Arboretum in the mid-1980s. It was introduced for the purpose of dune stabilisation and for ornamental use. The fruit of *V. rotundifolia* contains compounds that inhibit lung and colon cancer cells (Westbrooks and Brabson, 2007). According to Westbrooks and Brabson (2007), \"beach vitex meets the definition of a quarantine significant pest because it occupies a very small portion of its potential ecological range in mainland United States, and because it poses a serious threat to certain natural and biological resources (the stability of ocean front dunes and the plant and animal communities that occupy them), as well as the value of beachfront property. The pest risk potential of beach vitex listed as medium-high. Since the plant was intentionally introduced the likelihood of introduction is high. Consequences of introduction are medium due to low economic impact and serious environmental impacts (Westbrooks and Brabson, 2007).

Lifecycle Stages
Beach vitex flowers in May in the Carolinas (Gresham, undated), but can produce flowers throughout the year in Hawaii (HNPPD, 2001). The fruits ripen and dry in the summer while the leaves begin to dry and fall off in autumn, leaving a mat of tangled stems throughout the winter(Gresham, undated). The fruits are persistent on the plant in clusters (Gresham, undated). Seed germination takes up to 3-6 months (HNPPD, 2001).

Uses
Vitex was historically used to suppress sexual desire in women and for similar reasons became a culinary spice in monasteries, hence the common name Monk's pepper (SCNPS, undated). Some of the active chemical compounds in the plant have been linked to female hormone balance, female reproductive organs, menopause, actions on the pituitary gland, and treatment for acne (SCNPS, undated). Compounds in the plant have also been linked to inhibit lung and colon cancers (Gresham & Neal, undated). The plant was originally introduced as an erosion control and ornamental in the United States, however its negative effects on coastal species communities does not favour it for this use (SCNPS, undated). In its native range this plant makes an excellent ground cover, ornamental, and sand dune restoration plant (HNPPD, 2001). In Hawaii the flowers and seeds of the plant are used in the making of leis (HNPDD, 2001). In Japan *V. rotundifolia* is used as a cold and headache remedy. In Korea the fruit has also been used for the relief of headches caused by upper respiratory infection. Also in Korea it has been used for the rehabilitation and landscaping in seaboard areas (Westbrooks and Brabson, 2007).

Habitat Description
Vitex rotundifolia is an obligate sand dune species (Kim, 2005). It is found at low elevations on beaches, sand dunes, and rocky shorelines (HNPPD, 2001). Beach vitex is highly salt and drought-tolerant (GRI, 2006) and grows best in full sun and sandy or well-drained soils (SCNPS, undated). . According to Madsen,*et al*, (2005), the plant can survive in five U.S. hardiness zones, which increases the likelihood that this plant may spread to a much wider climatic and geographical range in the United States than it currently occupies.

Reproduction
Vitex rotundifolia reproduces by seed and vegetatively. The plant is a prolific seed producer with estimated seed crops of 22,000 seed/square metres, with field tests resulting in 30% germination (Gresham & Neal, undated). Beach vitex can spread vegetatively through rooting at leaf nodes along runners that can reach lengths of up to 20 metres (GRI, 2006). The seed can be spread by birds eating the fruits while both the seed and stem fragments are dispersed by waves and high tides (GRI, 2006, FWS, undated).

General Impacts
Vitex rotundifolia is considered an invasive species in the Carolinas and has the potential to spread to many more coastal communities along the shores of the United States (Madsen,*et al*, 2005). Beach vitex is a rapidly growing and sprawling shrub both vertically and horizontally that is very tolerant of salt and drought (Gresham & Neal, undated). Beach vitex produces a large seed bank and can reproduce vegetatively through rooting at leaf nodes along runners (Gresham & Neal, undated). The impact of its aggressive growth pattern leads to little light reaching the soil surface where it dominates as monocultures preventing native species from establishing (Gresham & Neal, undated). In addition it has been suggested from scientific observations that the plant releases some allelopathic compounds that have actions in the soil to make it hydrophobic, causing drought stress to less tolerant native species (Gresham & Neal, undated). The structure of the plant's root system does not make it an ideal dune stabiliser compared to fibrous root systems of native species causing higher rates of dune erosion (SCNPS, undated). It causes mortality in young sea turtles by entangling them in its long runners and impacts nesting sites for reproductive females (SCNPS, undated) (please see impact information in the North and South Carolina distribution records). Beach vitex also impacts multi-million dollar beach renourishment projects (Madsen,*et al*, 2005).

Management Info
Preventative measures Currently federal, state, and local government, academic and non-profit organisations are attempting to get *Vitex rotundifolia* listed as a Federal Noxious Weed which would prohibit the sale and transport of the species in the country unless with a permit (Madsen,*et al*, 2005). Getting the species listed would also help promote eradication programmes and monitoring of new populations if they arise (Madsen,*et al*, 2005). Other measures that have been in effect are publications through non-profits, cooperative extensions, and government agencies on identification and how the public can report sightings and locations of populations (Sea Grant NC, 2006).
Physical Hand-pulling, digging, and the use of machinery are all options that can be used to remove beach vitex, however due to the fragile nature of the dunes and the risk of erosion these methods should be used with caution (Gresham & Neal, undated; SCNPS, undated). Any mechanical methods to remove the plant should be thorough to make sure that the root ball or any stem fragments are not left behind to reestablish (Sea Grant NC, 2006). Mechanical methods to reduce the seed and stem fragments from spreading are to clip any flowering or fruiting stems and gently remove any long seaward runners (FWS, undated). Any beach vitex plant material should be sealed in plastic bags and taken to a landfill rather than mulched or composted as plant parts can reestablish(FSW, undated).
Chemical Several different techniques of herbicide application are being tested on beach vitex. Three different techniques can be used to apply a herbicide to the plant. One method is to cut the aboveground vegetation back to a stump and then apply a glyphosate paint to the exposed cut (Sea Grant NC, 2006; Grisham, undated). The second method is to wound the stem and then apply a herbicide to the wound (Sea Grant NC, 2006). The third method is to apply an oil based herbicide mixture to the stem in a 30-45cm length band at the base of the stem (Sea Grant NC, 2006). Herbicides should be selected carefully and used with caution as well as in appropiate amounts due to the sensitivity of the area and its proximity to the ocean (Sea Grant NC, 2006).
Cultural Revegetation with native grass and dune species should be incorporated into any control program to prevent erosion and recolonization (Gresham, undated).

Pathway
Beach vitex was mainly introduced into the United States for dune stabilization and coastal erosion control (Madsen,*et al*, 2005).*Vitex rotundifolia* was introduced into the United States partly as an ornamental plant (Madsen,*et al*, 2005) and is still being sold in nurseries in Texas, Virginia, and Alabama (SCNPS, undated).

Principal source: Gresham, C.A., & Neal, A., undated, An Evaluation of the Invasive Potential of Beach Vitex (*Vitex rotundifolia*)
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Compiler: National Biological Information Infrastructure (NBII) & IUCN/SSC Invasive Species Specialist Group (ISSG)

Review: Expert review underway: Dr. Randy G. Westbrooks \ USGS BRD\ Whiteville, North Carolina\ USA

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ALIEN RANGE

[5] UNITED STATES

Red List assessed species 5: CR = 3; EN = 2;

Caretta caretta **EN**
Dermochelys coriacea **CR**
Lepidochelys kempii **CR**
Chelonia mydas **EN**
Eretmochelys imbricata **CR**

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