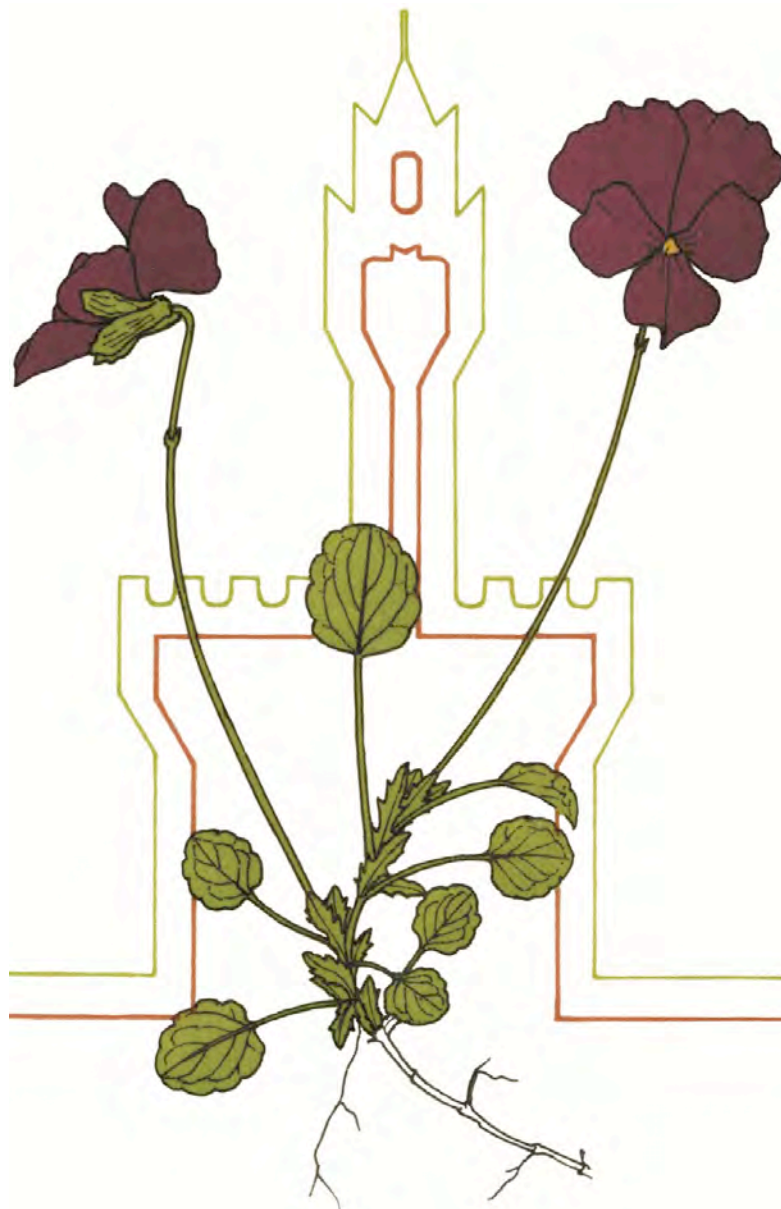


With the High Patronage of the President of the Italian Republic

Società Botanica Italiana

109° Congresso



International Plant Science Conference (IPSC)

from Nature to Technological Exploitations

Florence, 2 - 5 September 2014

4.1 = DETECTING INVASION HOTSPOTS OF *AILANTHUS ALTISSIMA* WITH REMOTE SENSING

LUCA RAIMONDO¹, ANDREA SCIANNA², FRANCESCO M. RAIMONDO³, GIUSEPPE BAZAN⁴

¹Department of Architecture, University of Palermo, Italy; ²Italian National Research Council (CNR) of Palermo;

³Department of Biological, Chemical and Pharmaceutical Science and Technology / Botanical Garden, University of Palermo, Italy ⁴Department of Agricultural and Forest Sciences, University of Palermo, Italy

Named as “tree-of-heaven”, *Ailanthus altissima* is an invasive pioneer species and rapidly spreads onto disturbed sites. The *taxon*, native of Moluccas Island, North Vietnam and China, was first introduced into England and France in 1751 by a missionary who mistook it for a Japan varnish tree (*Toxicodendron vernicifluum*) (1).

It was introduced into Italy in 1760 in the Botanical Garden of Padoa (2), and between 1784 and 1786 it was present into botanical gardens of Tuscany (3). *Ailanthus altissima* was reported in Sicily for the first time in the floristic list of Palermo Botanical Garden edited by Giuseppe Tineo (4).

For the past 250 years, *Ailanthus altissima* has been rapidly spreading throughout Europe and North America, cultivated as ornamental plant (5).

This plant is so invasive because of its biological and ecological characters. *Ailanthus* produces large numbers of wind-borne seeds, grows quickly, tolerates stress, and can also reproduce asexually via root sprouts (6).

Ailanthus altissima today is only invasive alien tree still present in all Italian regions (7).

The effect of its invasiveness are really visible also in Sicily (8), in particular in Palermo, where it colonizes ruderal environments like road borders, ruins in the historical centre. *Ailanthus altissima* is a serious threat to historical gardens and city parks.

The distribution of the species in the urban areas and the hotspots of plant spread need to be evaluated in order to set action of invasiveness control.

Remote-sensing technology allows as to define with good approximation the present of the species in the environment wise the most compromised urban areas

For this purpose we decided to utilize the MIVIS *airborne multispectral sensor* imaging because, compared to other satellite sensors they have a band range of 102.

Furthermore MIVIS images allow, through a specific noise screening, a more precise tree-of-heaven spotting and the extrapolation of specific spectral signatures using the NDVI (*Normalized Different Vegetation Index*). The result of this process is a raster map of hotspots of *Ailanthus altissima* in Palermo.

This ground-breaking methodology allows a fast and accurate data collection for mapping of invasive species in urban areas.

1) P.P. Feret (1985) J. Arboricult., 11, 361-368

2) P.A. Saccardo (1890) Atti e Mem. Reg. Accad. Sc. Lett. Arti Padova, n. ser., 6 (1889-1890), 173-176

3) G. Savi (1801) Pisa, 250 pp.

4) G. Tineo (1802) Panormi, 34 pp.

5) P.L. Burch, S.M. Zedaker (2003) Journal of Arboriculture 29,1, 18-24

6) L.B. Knapp, C.D. Canham (2000) Journal of the Torrey Botanical Society, 307-315

7) L. Celesti-Grapow, F. Pretto, E. Carli, C. Blasi (2010) Palombi, Roma

8) F.M. Raimondo (2012) Sistemi biologici e beni culturali. Atti convegno nazionale AIAA. Palermo 6-7 Ottobre 2009, 113-123