

Scientific name	<i>Parthenium hysterophorus</i>
Common name	Whitetop Weed
Broad group	Plant
Number of and countries wherein the species is currently established	Not yet established in Europe.
Risk Assessment Method	EPPO
Links	http://www.eppo.int/QUARANTINE/Pest_Risk_Analysis/PRAdocs_plants/14-19987_PRA_Parthenium_hysterophorus.docx http://www.eppo.int/QUARANTINE/Pest_Risk_Analysis/PRAdocs_plants/14-19988_PRA_report_Parthenium_hysterophorus.docx
5. Can broadly assess environmental impact with respect to biodiversity and ecosystem patterns and processes	Socio-economic benefit: <i>P. hysterophorus</i> could efficiently reduce heavy metal pollution in soil (Ahmad & Al-Othman, 2014).
6. Can broadly assess environmental impact with respect to ecosystem services	<i>Parthenium hysterophorus</i> can affect the survival of earthworms that are essential to soil formation (Rajiv <i>et al.</i> , 2014).
7. Broadly assesses adverse socio-economic impact	Data not available for Europe but in Australia it costs farmers and pastoralists \$A 100 million per year (Adkins & Shabbir, 2014). In Australia, this weed is a declared 'Weed of National Significance' and mainly occurs in Queensland where it has invaded <i>ca.</i> 600,000 km ² of pasture land and has reduced beef production by <i>ca.</i> AU\$100 million annually (Shabbir <i>et al.</i> , 2014)
8. Includes status (threatened or protected) of species or habitat under threat	No information.
9. Includes possible effects of climate	The effects of climate change were shown to be neutral effect for this species (Shabbir <i>et al.</i> , 2014). In this study, they used <i>P. hysterophorus</i> and

<p>change in the foreseeable future</p>	<p>one of its biological control agents, the winter rust (<i>Puccinia abrupta</i> var. <i>partheniicola</i>) (Shabbir & Bajwa, 2006, Shabbir <i>et al.</i>, 2013) as a model system to investigate how the weed may respond to infection under a climate change scenario involving an elevated atmospheric CO₂ (550 umol mol⁻¹) concentration. Under such a scenario, <i>P. hysterophorus</i> plants grew significantly taller (52%) and produced more biomass (55%) than under the ambient atmospheric CO₂ concentration (380 umol mol⁻¹). Following winter rust infection, biomass production was reduced by 17% under the ambient and by 30% under the elevated atmospheric CO₂ concentration. The production of branches and leaf area was significantly increased by 62% and 120%, under the elevated as compared with ambient CO₂ concentration, but unaffected by rust infection under either condition. The photosynthesis and water use efficiency (WUE) of <i>P. hysterophorus</i> plants were increased by 94% and 400%, under the elevated as compared with the ambient atmospheric CO₂ concentration. However, in the rust-infected plants, the photosynthesis and WUE decreased by 18% and 28%, respectively, under the elevated CO₂ and were unaffected by the ambient atmospheric CO₂ concentration. The results suggest that although <i>P. hysterophorus</i> will benefit from a future climate involving an elevation of the atmospheric CO₂ concentration, it is also likely that the winter rust will perform more effectively as a biological control agent under these same conditions.</p>
<p>11. Documents information sources</p>	<p>Adkins S, Shabbir A. 2014. Biology, ecology and management of the invasive Parthenium weed (<i>Parthenium hysterophorus</i> L.). <i>Pest. Management Science</i> 70: 1023-1029.</p> <p>Ahmad A, Al-Othman AA. 2014. Remediation rates and translocation of heavy metals from contaminated soil through <i>Parthenium hysterophorus</i>. <i>Chemistry and Ecology</i> 30: 317-327.</p> <p>Rajiv P, Rajeshwari S, Rajendran V. 2014. Impact of Parthenium weeds on earthworms (<i>Eudrilus eugeniae</i>) during vermicomposting. <i>Environmental Science and Pollution Research</i> 21: 12364-12371.</p> <p>Shabbir A, Bajwa R. 2006. Distribution of parthenium weed (<i>Parthenium hysterophorus</i> L.), an alien invasive weed species threatening the biodiversity of Islamabad. <i>Weed Biology and Management</i> 6: 89-95.</p> <p>Shabbir A, Dhilepan K, Khan N, Adkins SW. 2014. Weed-pathogen interactions and elevated CO₂: growth changes in favour of the biological control agent. <i>Weed Research</i> 54: 217-222.</p> <p>Shabbir A, Dhilepan K, O'Donnell C, Adkins SW. 2013. Complementing biological control with plant suppression: Implications for improved management of parthenium weed (<i>Parthenium hysterophorus</i> L.). <i>Biological Control</i> 64: 270-275.</p>

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Other contributing experts	Ioannis Bazos Alexandros Galanidis Belinda Gallardo
Notes	The species is considered as an emerging invader in the EPPO region. It has been recorded so far in Israel, Egypt, Poland and Belgium. Dry land cropping and grazing systems in the Mediterranean are likely habitats for this species to establish.
Outcome	Compliant