

## Express PRA for *Orgyia leucostigma* – Research and Breeding –

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Initiation: Application for an Express-PRA by the Federal State Lower Saxony, due to the application for a special authorisation for the movement and use of the organism for research and breeding purposes

*Initiation for the update: correction of the possible distribution in the EU*

Express-PRA	<i>Orgyia leucostigma</i>		
Phytosanitary risk for Germany	high <input checked="" type="checkbox"/>	medium <input type="checkbox"/>	low <input type="checkbox"/>
Phytosanitary risk for EU-Member States	high <input checked="" type="checkbox"/>	medium <input type="checkbox"/>	low <input type="checkbox"/>
Certainty of assessment	high <input checked="" type="checkbox"/>	medium <input type="checkbox"/>	low <input type="checkbox"/>
Conclusion	<p>The lepidopteran <i>Orgyia leucostigma</i> is endemic in Canada and the USA. So far, it does not occur in Germany. There are individual unconfirmed notifications from England. The species did not establish in the rest of Europe. At present, it is listed neither in the Annexes of Directive 2000/29/EC nor by EPPO.</p> <p><i>Orgyia leucostigma</i> infests a very broad range of host plants including commercially used crops in forests and agriculture and in public green spaces.</p> <p>Due to suitable climatic conditions in Germany and <i>in large areas in Europe, from the northern areas of Spain and Greece to Sweden and Finland</i>, it is assumed that the pest is capable to establish outdoors.</p> <p>Due to its damage potential for a multitude of host plants, <i>Orgyia leucostigma</i> presents a significant phytosanitary risk for Germany and other EU-Member States.</p> <p>Based on this risk analysis it is assumed that <i>Orgyia leucostigma</i> is able to establish in Germany and other Member States and to cause significant damage. Thus measures against the release of this potential quarantine pest should be met according to § 4a of the Plant Inspection Order.</p>		
Preconditions for Express-PRA fulfilled?	Yes, <i>Orgyia leucostigma</i> is a pest, it is not listed and so far, it has not established in the area covered by the reporting plant protection service.		
Taxonomy, trivial name, synonyms	Lepidoptera, Eribidae, Lymantriinae (moths), <i>Orgyia leucostigma</i> (J.E. Smith, 1797); Synonym <i>Hemerocampa leucostigma</i> , Trivial name: white-marked tussock moth		

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<b>Does a relevant earlier PRA exist?</b>	No
<b>Distribution and biology</b>	<p>The species is endemic in the eastern part of North America. The southern distribution boundary lies in Texas, <i>Florida</i> and New Mexico, in the North the presence is known up to Manitoba and Alberta (Canada). The species has a high reproduction rate. <i>The females prefer to pupate not on their host plants but at protected sites on trees (underneath of branches, under the bark or in bark cracks, tree cavities) but also on objects made by humans, e.g. roofed house walls and fences (Hall &amp; Buss, 2014).</i> The females are not capable to fly and position 100-300 eggs in a single nest on the cocoon where they pupated. In the natural range, <i>O. leucostigma</i> completes 1-3 generations per year (Isaacs &amp; van Timmeren, 2009). The species hibernates as egg. The larvae emerge in spring and distribute via “ballooning” (flight with the wind on silk filaments) (Hall &amp; Buss, 2014).</p>
<b>Presence of host plants in the PRA-area? If so, which?</b>	<p>More than 140 host plants for <i>O. leucostigma</i> are known. (Plantwise).</p> <p>In Germany and in Europe, a variety of the host plants for <i>O. leucostigma</i> is distributed wildly and is also cultivated. The species infests deciduous and coniferous trees, herbs and weeds. Potentially relevant crops f. e. are apple, plum, cherry, pear, blueberry, maize, rose and many genera used in forestry like <i>Acer, Abies, Alnus, Betula, Carpinus, Castanea, Cornus, Corylus, Larix, Pinus, Populus, Quercus, Salix, Ulmus</i>. Also endemic herbs and ornamentals are suitable hosts.</p>
<b>Transfer pest consignment → host plant</b>	<i>The eggs of this species can be moved via bark, tree trunks and with wooden packaging material with and without bark (CABI, 2018).</i>
<b>Is a vector /further plant needed for host alternation? Which? Distribution?</b>	No vector is needed. The adult short-winged females are not capable to fly. The spread happens via “ballooning” of the young larvae (Hall & Buss, 2014) and migration of the bigger larvae.
<b>Climate in the distribution area comparable to PRA-area?</b>	<p>The natural range of the pest is the Eastern North America. It is present from Texas and <i>Florida</i> (USA) up to the mid of Manitoba (Canada) (Butterflies and Moths of North America, 2018). Germany and <i>large parts of Europe</i> have a comparable climate, <i>summer-dry areas seem climatically unsuitable for O. leucostigma.</i></p>
<b>If no, are there host plants in</b>	Yes, a multitude of plants can be concerned, also crops in

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<b>protected cultivation?</b>	greenhouses.
<b>Damage to be expected in the PRA-area?</b>	<p>Yes, in the natural range of <i>O. leucostigma</i>, the species is limited by a broad spectrum of natural antagonists like viruses, parasitoids and diseases (Hall &amp; Buss, 2014; Ontario Apple IPM, 2009). Without these natural antagonists mass outbreaks and severe damage are possible. In the natural range, the economic damage mostly is insignificant. The caterpillars are able to defoliate Christmas trees so that they are unmarketable. Sometimes there are reports of completely defoliated blueberry fields (<i>Vaccinium</i> sp.) in Nova Scotia, Canada and Michigan with significant crop loss (Plantwise). <i>O. leucostigma</i> rarely occurs as an apple pest. The young larvae skeletonise the leaves of deciduous trees. Bigger larvae feed the complete leaves except the mid-vein and the stem. Without measures, a severe defoliation of the trees might be the result. In the case of subsequent infestation years, the trees may die (Ontario Apple IPM, 2009). In 1998, there was a mass occurrence in Nova Scotia (Canada) in a forest area of 1.4 million hectares. 60 000 hectares were treated against the species. This led to costs of app. 6 million \$ (Nova Scotia Department of Natural Resources, 2017).</p>
<b>Is an infestation easy to eradicate?</b>	<p>In most cases, an infestation in the natural range is only detected after the first defoliation of the host plants. The pest is spread via the tiny freshly emerged larvae. It is possible to catch the males of the species by means of pheromone traps (Isaacs &amp; van Timmeren, 2009). <i>O. leucostigma</i> can be mistaken with the endemic <i>Orgyia</i> sp. A chemical treatment with a variety of agents like Azadirachtine, Carbaryl, Spinosad, Chlorpyrifos and others is possible. The application is most effective when the caterpillars are app. 12mm long. The use of <i>Bacillus thuringiensis kurstaki</i> is very effective against small larvae. The use of sexual pheromones to confuse the males proved to be very effective with rates of 96-100% (Plantwise).</p>
<b>Remarks</b>	<p>In the case of transportation and use of the organism, it must be secured that the release is hindered. Handling with the caterpillars it must be considered that the fine hairs can irritate the skin.</p>
<b>Literature</b>	<p>Butterflies and Moths of North America (2018) White-marked Tussock Moth <i>Orgyia leucostigma</i> (J E Smith, 1797).  <a href="https://www.butterfliesandmoths.org/species/Orgyia-">https://www.butterfliesandmoths.org/species/Orgyia-</a></p>

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	<p><a href="#">leucostigma</a> (accessed on 25-05-2018)</p> <p><i>CABI (2018) Datasheet Orgyia leucostigma (white-marked tussock moth). Invasive Species Compendium, <a href="https://www.cabi.org/isc/datasheet/37807">https://www.cabi.org/isc/datasheet/37807</a> (Update: 24-05-2018)</i></p> <p>Hall, D.W., Buss, L. (2014) Featured Creatures. Entomology and Nematology Department, University of Florida. <a href="http://entnemdept.ufl.edu/creatures/URBAN/MEDICAL/tussock_moths.htm">http://entnemdept.ufl.edu/creatures/URBAN/MEDICAL/tussock_moths.htm</a> (accessed on 25-05-2018)</p> <p><i>Issacs, R., van Timmeren, S. (2009) Monitoring and Temperature-Based Prediction of the Whitemarked Tussock Moth (Lepidoptera: Lymantriidae) in Blueberry. Horticultural Entomology 102(2), 637-645.</i></p> <p>Nova Scotia Department of Natural Resources (2017) Forest Health Conditions in Nova Scotia, 2015 Annual Report. Fleet and Forest Protection Division, Risk Services Section. <a href="https://novascotia.ca/natr/forestprotection/foresthealth/pdf/2015_Annual_Report_Forest_Health_modified.pdf">https://novascotia.ca/natr/forestprotection/foresthealth/pdf/2015_Annual_Report_Forest_Health_modified.pdf</a> (accessed on 25-05-2018)</p> <p>Ontario Apple IPM (2009) White marked tussock moth. <a href="http://www.omafra.gov.on.ca/IPM/english/apples/insects/white-marked-tussock-moth.html#advanced">http://www.omafra.gov.on.ca/IPM/english/apples/insects/white-marked-tussock-moth.html#advanced</a> (accessed on 24-05-2018)</p> <p>Plantwise (o.D.) Plantwise Technical Factsheet: white-marked tussock moth (<i>Orgyia leucostigma</i>). Plantwise Knowledge Bank, <a href="http://www.plantwise.org">www.plantwise.org</a> (accessed on 24-05-2018)</p>



**Fig. 1** Larva on *Orgyia leucostigma* (Photo: Gerald J. Lenhard, Louisiana State University, Bugwood.org)



**Fig. 2** Female at oviposition (Photo: John L. Foltz, University of Florida, Bugwood.org)



**Fig. 3** Male of *O. leucostigma* (Photo: Mark Dreiling, Bugwood.org)