

# **Environmental and Social Risk Assessment for Tebufenozide**

**Pennsylvania Department of Conservation &  
Natural Resources, Bureau of Forestry**

**2020**

## Management Unit ESRA for Tebufenozide

### Environmental Assessment

|                   |                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pesticide:        | Tebufenozide                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b><u>Specific Formulation:</u></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Hazard Status:    | Not designated                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Mimic 2LV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Exposure Elements | Minimum list of values                                                      | Description of why/why not a risk on the Management Unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Management Unit Mitigation strategies defined to minimize risk                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Environmental     | Soil (erosion, degradation, biota, carbon storage)                          | No indication of adverse effects to soil was found with Tebufenozide when used according to label instructions in aerial forestry applications.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>Follow all pesticide label application instructions. Follow applicable criterion and indicators from the FSC US FM Standard V1.0 (e.g., Criterion 4.3 for worker safety, Criterion 7.3 for worker training, Criterion 6.5 for protecting water resources, and Criteria 8.1 and 8.2 for Monitoring). Applicators or persons supervising application of restricted use pesticides are required to be certified in accordance with EPA regulations and state, territorial and tribal laws. Additional risk mitigation strategies are provided below. Organizations should take reasonable steps to avoiding environmental and social impacts by considering the mitigation strategies provided below, as well as application-, Organization-, or location-specific strategies.</p> <p><b>General consideration of exposure variables designed to mitigate risk:</b></p> <ul style="list-style-type: none"> <li>-Know and understand the specific pesticide formulation and/or tank mixture, as its unique formulation may provide a different risk characterization.</li> <li>-Understand how the mixture of active ingredients affects the pesticides risk profile.</li> <li>-Seek to minimize the frequency, interval, and amount of application.</li> <li>-Use the most efficient and effective method of application by seeking to minimize risk to environmental and social values.</li> <li>-Understand the site (e.g., soil type, topography, etc.) and climatic (e.g., wind, temperature, and</li> </ul> |
|                   | Water (ground water, surface waters, water supplies)                        | No risk to aquatic species with or human water resources when applied and used by the manufacturer's label.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                   | Atmosphere (air quality, greenhouse gasses)                                 | No indication of adverse effects to atmosphere was found with Tebufenozide when applied and used by the manufacturer's label.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Environmental     | Non-target species (vegetation, wildlife, bees and other pollinators, pets) | <p>The use of tebufenozide to control the gypsy moth may result in adverse effects in nontarget <i>Lepidoptera</i> but there is little indication that other species will be impacted under normal conditions of use even at the highest application rate. (1)</p> <p>Effects on birds due to a decrease in available prey – i.e., terrestrial invertebrates – may be plausible. (1)</p> <p>Adverse effects in aquatic species are not expected under normal conditions of use. In the case of a large accidental spill into a relatively small body of water, however, adverse effects could be expected in aquatic vertebrates, invertebrates, and plants. (1)</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

|  |                                                                                                |                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Non-timber forest products (as FSC-STD-01-001 V5-2 FSC Principles and Criteria, criterion 5.1) | No indication of adverse effects to non- timber forest products was found with Tebufenozide when applied and used by the manufacturer's label. | <p>humidity) conditions and the likely effect on risk to environmental and social values.<br/>-Have appropriate waste management systems in place.</p> <p><b>Mitigating Risk to the Environment:</b> <i>reduce contact with water resources and minimize application amounts and number of applications.</i></p> <p><i>General and non-target species:</i></p> <p><i>Water:</i></p> <ul style="list-style-type: none"> <li>-Do not contaminate surface or ground water by cleaning equipment or disposal of wastes, including equipment wash water (2).</li> <li>-Do not apply when weather conditions favor drift (2).</li> <li>-Do not apply over lakes, open streams, rivers, or ponds (2). Use buffer strips between application areas and sensitive areas. (2)</li> <li>- Applying this product in calm weather when rain is not predicted for the next 6 hours will help to ensure effectiveness by preventing wind or rain from blowing or washing pesticide off the treatment area (2).</li> <li>-Rinsing application equipment over the treated area will help avoid run off to water bodies or drainage systems (2).</li> </ul> <p>All annual treatments of Tebufenozide are submitted for rigorous environmental review through jurisdictional agencies in Pennsylvania. All treatments are reviewed for adverse effects to plants, wildlife, and invertebrates by the Pennsylvania Department of Conservation and Natural Resources (plants and invertebrates), the Pennsylvania Game Commission (wildlife), the Pennsylvania Boat Commission (fish, reptiles, invertebrates), and the US Fish and Wildlife Service (wildlife). All agencies provide concerns, restrictions, and mitigation measures if necessary.</p> |
|  | High Conservation Values (particularly HCV 1-4)                                                | No indication of adverse effects to High Conservation Values was found with Tebufenozide when applied and used by the manufacturer's label.    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|  | Landscape (aesthetics, cumulative impacts)                                                     | No indication of adverse effects to landscape values was found with Tebufenozide when applied and used by the manufacturer's label.            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|  | Ecosystem services (water, soil, carbon sequestration, tourism)                                | No indication of adverse effects to ecosystem services was found with Tebufenozide when applied and used by the manufacturer's label.          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

|  |  |  |                                                                                                            |
|--|--|--|------------------------------------------------------------------------------------------------------------|
|  |  |  | The results of these environmental reviews are submitted to the USDA Forest Service as a matter of record. |
|--|--|--|------------------------------------------------------------------------------------------------------------|

## Social Assessment

|                          |                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Pesticide:</b>        | <b>Tebufenozide</b>                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b><u>Specific Formulation:</u></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Hazard Status:</b>    | <b>Not designated</b>                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Mimic 2LV</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Exposure Elements</b> | <b>Minimum list of values</b>                                                                                                                        | <b>Description of why/why not a risk on the Management Unit</b>                                                                                                                                                                                                                                                                                                                                                                                       | <b>Management Unit Mitigation strategies defined to minimize risk</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                          | High Conservation Values (especially HCV 5-6)                                                                                                        | No indication of adverse effects to high conservation values was found with Tebufenozide when applied and used by the manufacturer's label.                                                                                                                                                                                                                                                                                                           | Follow all pesticide label application instructions. Follow applicable criterion and indicators from the FSC US FM Standard V1.0 (e.g., Criterion 4.3 for worker safety, Criterion 7.3 for worker training, Criterion 6.5 for protecting water resources, and Criteria 8.1 and 8.2 for Monitoring). Applicators or persons supervising application of restricted use pesticides are required to be certified in accordance with EPA regulations and state, territorial and tribal laws. Additional risk mitigation strategies are provided below. Organizations should take reasonable steps to avoiding environmental and social impacts by considering the mitigation strategies provided below as well as application-, Organization-, or location-specific strategies. |
|                          | Health (fertility, reproductive health, respiratory health, dermatologic, neurological and gastrointestinal problems, cancer and hormonal imbalance) | <p>Minimal indication of adverse effects to health values was found when Tebufenozide is used according to label instructions in forestry applications. Additional considerations are provided below.</p> <p>At the maximum application rate considered in this risk assessment, two applications at 0.12 lb/acre spaced three day apart, there is little indication that adverse effects on human health are likely when using tebufenozide. (1)</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

|        |                                                                                                                             |                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Social | Welfare                                                                                                                     | No indication of adverse effects to welfare was found with Tebufenozide when applied and used by the manufacturer's label.               | <p><b>General consideration of exposure variables designed to mitigate risk:</b></p> <ul style="list-style-type: none"> <li>-Know and understand the specific pesticide formulation, as its unique formulation may provide a different risk characterization.</li> <li>-Understand the mixture of active ingredients.</li> <li>-Seek to minimize the frequency, interval, and amount of application.</li> <li>-Use the most efficient and effective method of application by seeking to minimize risk to environmental and social values.</li> <li>-Understand the site (e.g., soil type, topography, etc.) and climatic (e.g., wind, temperature, and humidity) conditions and the likely effect on risk to environmental and social values.</li> <li>-Have appropriate waste management systems in place.</li> </ul> <p><b>Mitigating Risk to Workers:</b> <i>When applying pesticides, label instructions should be followed.</i></p> <p>For all pesticide applications, Personal Protective Equipment (PPE) should be worn as follows:</p> <ul style="list-style-type: none"> <li>• chemical-resistant gloves,</li> <li>• overalls or long-sleeved shirt and long pants,</li> <li>• shoes/boots plus socks,</li> <li>• eye protection (goggles, or safety glasses with side shields),</li> <li>• an appropriate respirator if called for in applicable Safety Data Sheets.</li> </ul> <p><i>Adhere to the below exposure controls (2):</i></p> <ul style="list-style-type: none"> <li>-Wash hands thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, using the toilet or applying cosmetics.</li> <li>-In case of skin contact: Take off contaminated clothing and shoes immediately. Wash off</li> </ul> |
|        | Food and water                                                                                                              | No indication of adverse effects to food and water was found with Tebufenozide when applied and used by the manufacturer's label.        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|        | Social Infrastructure; (schools and hospitals, recreational infrastructure, infrastructure adjacent to the management unit) | No indication of adverse effects to social infrastructure was found with Tebufenozide when applied and used by the manufacturer's label. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|        | Economic viability (agriculture, livestock, tourism)                                                                        | No indication of adverse effects to economic viability was found with Tebufenozide when applied and used by the manufacturer's label.    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|        | Rights (legal and customary)                                                                                                | No indication of adverse effects to rights was found with Tebufenozide when applied and used by the manufacturer's label.                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|        | Others                                                                                                                      | No additional values were identified in this assessment.                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

|  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |  | <p>immediately with plenty of water for at least 15 minutes. Call a physician or poison control center immediately (2).</p> <p>Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Avoid breathing dust (2).</p> <p><i>Safe handling:</i></p> <ul style="list-style-type: none"> <li>-Maintain exposure levels below the exposure limit through the use of general and local exhaust ventilation.</li> <li>-Handle and open container in a manner as to prevent spillage (2).</li> </ul> <p><i>Storage requirements:</i></p> <ul style="list-style-type: none"> <li>-Store in original container and out of the reach of children, preferably in a locked storage area (2).</li> </ul> <p><b>Mitigating Risk to Public Access/Public Welfare:</b></p> <ul style="list-style-type: none"> <li>- Keep people and pets away from treated area until it has been watered and allowed to dry (2).</li> <li>-Reduce the possibility of public consumption of contaminated wild food (e.g., fruit or fungi) and public exposure to pesticides through public outreach and engagement, limiting access, and/or appropriate signage. For instance, users of the forest may be excluded from the area using barriers or signage until the pesticide dries.</li> <li>-In case of accidental release: Isolate hazard area. Keep unauthorized people away. Avoid contact with spilled product or contaminated surfaces (2).</li> <li>-Consider effects on local communities and indigenous peoples when considering limiting access to treatment areas.</li> <li>-Do not allow children or pets to enter the treated area until it has dried (2).</li> </ul> |
|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Sources

- (1) Syracuse Environmental Research Associates, Inc. 2004. Bacillus Human Health and Ecological Risk Assessment for Tebufenozide (B.t.k) Final Report. Prepared by Syracuse Environmental Research Associates, Inc. under USDA Forest Service BPA: WO-01-3187-0150. Retrieved from <https://www.fs.usda.gov/naspf/sites/default/files/volume-IV-appendixes-j-m-risk-assessments-risk-comparisons.pdf>
- (2) Valent Biosciences 2017. Mimic2LV Product Label. Retrieved at: <https://www.valentbiosciences.com/foresthealth/wp-content/uploads/sites/5/2017/03/mimic-2lv-label.pdf>