Synergy Shield Verbenone

Bark Beetle Anti-Aggregation Pheromone

Usage Guide for USA Customers

US EPA Registration No. 90515-2

ACTIVE INGREDIENT: 97.0% Verbenone, 4,6,6-trimethylbicyclo (3.1.1) hept-3-en-2-one

AVAILABLE PRODUCT FORMATS * sold in multiples of 10

- **Product # 3414** Synergy Shield Verbenone Bubble (USA only) – 0.98g/unit (90-120 day field life)
- **Product # 3562** Synergy Shield Verbenone Regular Pouch (USA only) – 5.88g/unit (90-120 day field life)
- **Product # 3413** Synergy Shield Verbenone Extended Life Pouch (USA only) – 7.84g/unit (120-150 day field life)

PRODUCT OVERVIEW

Synergy Shield Verbenone can be used to deter mass attack by tree killing bark beetles in pine stands and protect susceptible trees. **Synergy Shield Verbenone** is a natural bark beetle **"anti-aggregation" pheromone** formulated into a controlled release device. Pheromones are message-bearing chemicals **("semiochemicals")** used by many different species in nature to communicate. Tree-killing bark beetles use "a**ggregation" pheromones** to coordinate their arrival and mass attack susceptible host trees. As more beetles are attracted and continue to attack the tree the pheromone plume increases in intensity and starts to change. As infested trees age for a few months they become unsuitable as a resource. At this time the beetles and fungi in the tree release an **"anti-aggregation" pheromone, verbenone. Anti-aggregation** pheromones will help prevent incoming beetles from landing and keep them flying in search of a suitable host. They act like the brightly lit **"No Vacancy"** text on a Motel sign. Synergy Shield verbenone is registered for protection of pine trees from pine infesting bark beetles, but the majority of work showing good efficacy has been has been focussed on the mountain pine beetle *(Dendroctonus ponderosae).* If uncertain of current insect you are facing, please contact a local forester or reach out to the forest entomologists at Synergy for additional guidance (synergy@semiochemical.com).

WHEN AND WHERE TO USE

Use Synergy Shield Verbenone to protect pine trees in forests, municipal and shade tree areas, recreational areas such as campgrounds, riparian areas, golf courses, parks and parkways, ornamental and shade tree plantings, suburban areas, and rights of way and other easements. Mountain pine beetle flight occurs primarily while temperatures are between 70-85 °F. Place Synergy Shield Verbenone at least 2 weeks prior to expected beetle flight. Under normal weather conditions Synergy Shield Verbenone provides a constant release of verbenone over a 90 to 120 day period (150 days for XL pouch) in the field depending on conditions. A verbenone application in late May will provide protection into mid-September in most locations. Due to changing climatic conditions normal beetle flight periods are reported to be changing in some areas, with flight starting earlier in the spring and extending later into the fall. For these circumstances we have developed the "**Extended Life Verbenone pouch**" which will last 20% longer in the field (approx. 150 days at 78°F). This product in best suited for warmer climates at lower elevations or south facing sites that have a longer flight period available to the beetle. We would also recommend using this pouch in southern and/or low elevation hot and dry locations in the USA.

HOW TO USE

Verbenone pouches or bubbles should be stapled directly to mature pine trees at a height of 7-12 ft on the north side. Attach to tree using flashing on the device being careful not to puncture reservoir. The odour plume from a pouch or a bubble has an approximate radius of 12 ft so placing release devices at a spacing of 25 ft will provide consistent odour plume coverage. Note that wind will move the pheromone plume so wind in the day time is an important consideration.

CHOOSING A FORMAT

On the landscape when bark beetles attack you will often see attack epicenters with many trees fully attacked and some perimeter trees partially attacked around the perimeter. Verbenone bubbles have a low release rate (6 mg /day at 78°F) compared to verbenone pouches (60mg/day at 78°F). Bubble caps thus release a lower concentration of verbenone, more comparable to what you might expect form individual attacked pine trees. A Synergy Shield Verbenone pouch will provide a larger more concentrated odour plume, similar to what would come from a cluster of mass attacked pine trees.

Synergy recommends a mixture of pouches and bubbles to accommodate changes in forest stand structure and mimic typical bark beetle attack dynamics. Placing a few Synergy Shield pouches on the largest mature trees in a cluster and then adding Synergy Shield Verbenone bubble caps on trees around the perimeter will create a dense central pheromone odour plume with scattered point sources of verbenone around the perimeter at a wider spacing. Verbenone Bubble caps are useful in stretching your area of defense by interspersing between pouches. This strategy can be effective in open or broken canopy pine stands and for clusters of trees around home sites separated by open areas.

Due to changing climatic conditions atypical beetle flight periodicity has been reported in some areas; for these circumstances Synergy now offers Extended Life Verbenone pouch, which will last 20% longer in the field than our regular Verbenone pouch, so may be applied earlier in the season. We would recommend using this pouch in southern and/or low elevation hot/dry locations in the USA instead of the regular pouch.

RECOMMENDED APPLICATION RATES

	Product # 3414 **Synergy Shield Verbenone Bubble**	**Product # 3562** **Synergy Shield Verbenone Regular Pouch and** **Product # 3413** **Verbenone Extended Life Pouch**
Individual trees and area 1 acre or less	Place 2-6 bubbles on each tree depending on risk of attack and size of tree. For large trees (>24 inches diameter), add 1 more bubble for each additional 6 inches in diameter. Place additional devices 3 feet above previous device.	Place 1 or 2 Verbenone pouch on each tree depending on risk of attack and size of tree. For large trees (>24 inches diameter), add 1 more pouch for each additional 12 inches in diameter. Place additional devices 3 feet above previous device.
Forested stands over 1 acre	• Minimum dose 120 bubbles/acre • Maximum dose 410 bubbles/acre.	• Minimum dose 25 pouches/acre. • Maximum dose, 75 pouches/acre.

Perimeter Protection (when the concern is beetle moving from an infested area into an uninfested stand): On contour of perimeter, place 1 Synergy Shield Verbenone every 15 feet along length of perimeter. Move in 30 feet and repeat with a second line offset between treated trees in the first line.

PRECAUTIONS

- Store Verbenone devices frozen in an airtight container (sealed glass jar).
- **DO NOT PUNCTURE THE BUBBLE RESRVOIR!** Puncturing will release the Verbenone immediately.
- Avoid contact with eyes, skin or clothing - Harmful if swallowed or absorbed through skin. Use disposable gloves.
- Open storage bag in a well-ventilated area.
- Do not contaminate water, food, or feed by storage or disposal.
- It is a violation of Federal law to use this product in a manner inconsistent with its labelling.