Objective

To create a pest management plan for NHTI's high tunnel (Fig 1) to increase future yields and decrease potential financial strain. By following IPM guidelines to prevent/contain native and invasive pests as well as potential human threats.



Figure 1. High tunnel (jpg.Tlesser)

Native species Invasive species Southern migratory species

Fungal Prevention

• **Powdery Mildew** (Erysiphales) - A common fungal disease that thrives in high humidity and dark places that affects both foliage and fruit (Moorman, 2022). Decreasing humidity and increasing airflow and light will limit the risk of powdery mildew (Powdery mildew - extension - Purdue extension 2022). • Early Blight (Alternaria solani) – A common tomato disease that originates on the under side of oldest foliage appearing as dark brown spots (Sideman, 2019). The most successful prevention methods include pruning lowest foliage, providing lots of sunlight, and limiting moisture/humidity (Ask UNH Extension, 2018). You can monitor soil moisture and humidity using the hobo onset weather stations (Figure 5.) soil moisture meter (Figure 4.). The ideal temperature and humidity levels for enclosed growing can be seen in (Figure 3). • Transfer of ecological matter -. Sanitizing all tools, screening soils, and ensuring people do not wear contaminated clothing into the high tunnel.





Figure 5. Hobo onset weather station

Figure 3. Relative humidity and temperature chart

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Figure 2.. Japanese beetles

83% 89% 91% 95%



Figure 4. Soil moisture and relative humidity meter

Small Mammal and Insect Prevention

- Woodchucks (Marmota monax) (Fig 6) A burrowing rodent that is known to eat grasses, leafy crops, and an assortment of vegetables, including peapods, beans, carrots, and tomatoes (Eaton, 2018). Installing fencing into the ground approximately 12 inches deep with a horizontal section 18 inches wide will provide protection from woodchucks and other burrowing pests. (Eaton, 2018).
- Striped Cucumber Beetle (Acalymma vittatum) (Fig 7) Adult beetles over winter in the debris of cucumber crops and emerge in the late spring. Main food sources include the *Cucurbitaceae* family. Prevention methods include burying or burning debris from old crops and annually rotating crop locations (Eaton, 2016 a).
- Japanese Beetle) -(*Popillia japonica*) (*Fig 8*)- Feed on up to 350 species of plants but are partial to roses, fruits, and vegetables (Hahn, 2020). The most successful treatment method is hand removal and disposal of beetles (Ask UNH Extension, 2018).
- Tobacco Hornworm (Manduca sexta) (Fig 9) Eggs are laid on tomato plant foliage and when calipers hatch foliage is their main food source.. Hand removal of eggs is an option, but the best treatment is spraying plants with an insecticide including bacillus thuringiensis(Eaton, 2016b).

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Figure 6. Woodchuck



Figure 7. Striped cucumber beetle



Figure 8. Japanese beetle



Figure 9. Tobacco hornworm