Fir Tussock Moth *Orgyia detrita* Guérin-Méneville, 1831 (Lepidoptera: Erebidae: Lymantriinae)[1]

Donald W. Hall and Lyle Buss[2]

Introduction

Tussock moths in the genus *Orgyia* are small moths that are best known because of their attractive larvae.

In some years the larvae are very numerous and become a problem when they leave their host plants to search for suitable sites to spin their cocoons. Only the three species that are found in Florida will be discussed here. *Orgyia detrita* (the fir tussock moth) is the most common of the species in Florida followed by *Orgyia leucostigma* (the whitemarked tussock moth) and finally *Orgyia definita* (the definite tussock moth), which is rare in Florida (Foltz 2004).

Much of the older literature places the tussock moths in the family Liparidae and more recently in the Lymantriidae. They are now classified in the subfamily Lymantriinae in the family Erebidae (Beadle & Leckie 2012). *Orgyia leucostigma* was formerly placed in the genus *Hemerocampa*. For a detailed taxonomic history and synonyms, see Ferguson (1978).

Distribution

Orgyia detrita: Coastal Plain from Long Island to Florida and Gulf States west to Texas (Ferguson 1978, Wagner 2005, *Orgyia detrita* entry at North American Moth Photographers Group web site). It is uncommon in the northern parts of its range.

Orgyia leucostigma: Entire eastern United States and west to Minnesota and Texas (Ferguson 1978, *Orgyia leucostigma* entry at North American Moth Photographers Group web site). The form that occurs from South Carolina to Texas is subspecies *Orgyia leucostigma leucostigma* (Godfrey 1987).

Orgyia definita: Entire eastern United States. Most common in Northeast and mid-Atlantic states (Ferguson 1978, *Orgyia definita* entry at North American Moth Photographers Group website).

Description

Larvae

Larvae are 1–1.5 inches in length. They are characterized by hair pencils of black setae that extend forward from the prespiracular verrucae of the prothorax, a dorsal hair pencil of black setae on the eighth abdominal segment, dorsal tussocks on the first four abdominal segments, and mid-dorsal glandular structures on abdominal segments six and seven.

Orgyia detrita has two common color forms in Florida, a dark form and a light form. The sub-dorsal areas (sides) can be a dark gray as in Figures 1 and 2, or they can be light gray to light yellow as in Figure 3. The sides of *Orgyia leucostigma* are light in color, similar to the light form of *detrita*. There is a white or yellow line on each side of the dark mid-dorsal line of *leucostigma* (Ferguson 1978,

1. This document is EENY588, one of a series of the Entomology and Nematology Department, UF/IFAS Extension. Original publication date February 2014. Revised March 2020. Visit the EDIS website at https://edis.ifas.ufl.edu. This document is also available on the Featured Creatures website at http://entnemdedept.ufl.edu/creatures/.

2. Donald W. Hall, professor; and Lyle Buss, senior biological scientist and Insect ID Lab manager; Entomology and Nematology Department, UF/IFAS Extension, Gainesville, FL 32611.

Reviewed: 09/2023

Godfrey 1987). *Orgyia detrita* has bright orange spots along the back and sides, while the spots on *leucostigma* are yellow (Foltz 2004).

Figure 1. Fir tussock moth (*Orgyia detrita*) caterpillar (dorsal view).
Credits: Donald W. Hall, University of Florida

Figure 2. Fir tussock moth (*Orgyia detrita*) caterpillar (dorsal view)
Credits: Donald W. Hall, University of Florida

Figure 3. Fir tussock moth (*Orgyia detrita*) caterpillar (light form).
Credits: Donald W. Hall, University of Florida

Detrita and US populations of *leucostigma* have bright red heads, while *definita* are unique because of their tan or yellow heads. *Definita* is also lighter in body color than the other two species (Foltz 2004).

The dorsal glandular structures on segments six and seven of *leucostigma* are bright red, those of *detrita* are orange, and those of *definita* are pale yellow.

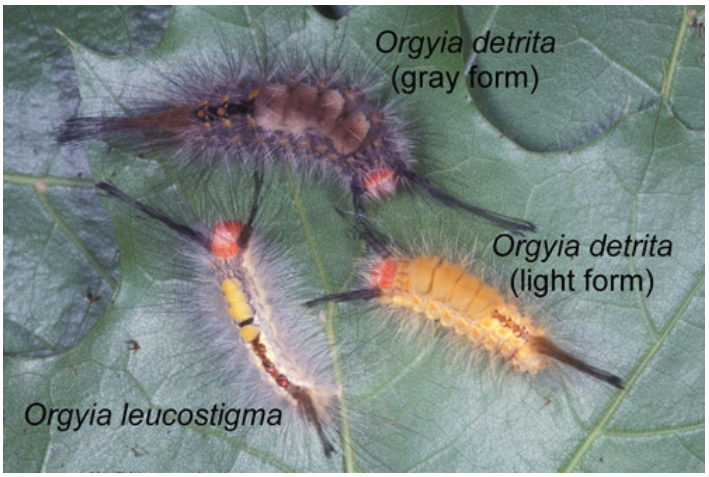

Figure 4. Fir tussock moth (light and dark forms), *Orgyia detrita*, and whitemarked tussock moth, *Orgyia leucostigma,* caterpillars.
Credits: Lyle Buss, University of Florida

Figure 5. Definite tussock moth (*Orgyia definita*) caterpillar (front view).
Credits: Lyle Buss, University of Florida

Figure 6. Definite tussock moth (*Orgyia definita*) caterpillar (abdomen).
Credits: Lyle Buss, University of Florida

Cocoons and Pupae

Cocoons are constructed of silk and setae from the caterpillars. They are usually found in protected places—in furrows in bark, undersides of limbs, in tree cavities, under loose bark, and often under the soffits of buildings. Also, they are commonly spun in dense masses among the foliage of epiphytic bromeliads (*Tillandsia* spp.).

Figure 7. Early cocoon of fir tussock moth (*Orgyia detrita*) before many setae are incorporated.
Credits: Donald W. Hall, University of Florida

Figure 8. Completed cocoon of fir tussock moth (*Orgyia detrita*).
Credits: Donald W. Hall, University of Florida

Figure 9. *Orgyia* sp. cocoons under eaves of building.
Credits: Donald W. Hall, University of Florida

Figure 10. *Orgyia* sp. cocoons among foliage of ballmoss (*Tillandsia recurvata*).
Credits: Donald W. Hall, University of Florida

Pupae appear hairy and have patches of dorsal spatulate setae ("vesicles" of Mosher 1916) on abdominal segments 1–3. The antennae of male pupae are longer and broader than those of females and the wings of male pupae are longer than those of female pupae. The wings of female pupae reach only slightly beyond the anterior margin of the fourth abdominal segment while those of male pupae extend nearly to the posterior margin of the segment (Mosher 1916).

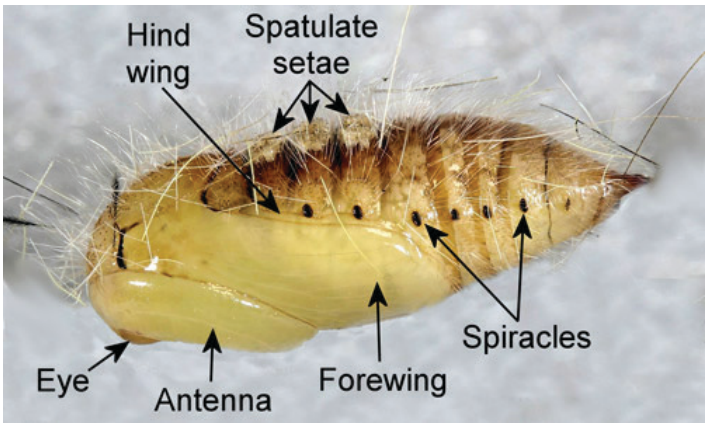

Figure 11. Recently molted male fir tussock moth (*Orgyia detrita*) pupa (lateral view), *Orgyia detrita.*
Credits: Donald W. Hall, University of Florida

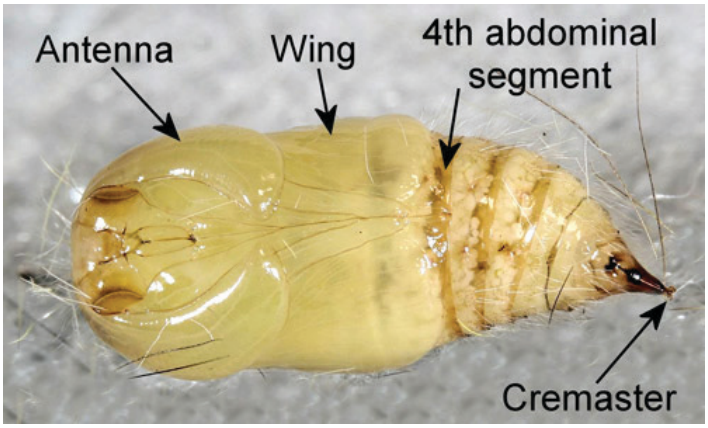

Figure 12. Recently molted male fir tussock moth (*Orgyia detrita*) pupa (ventral view).
Credits: Donald W. Hall, University of Florida

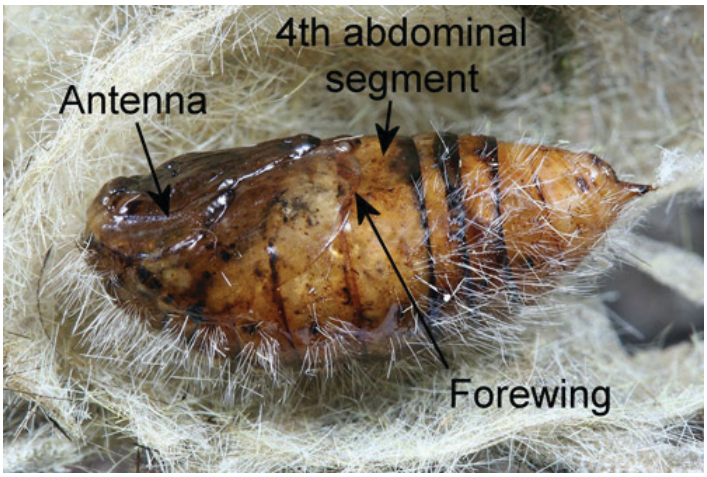

Figure 13. Mature female fir tussock moth (*Orgyia detrita*) pupa.
Credits: Donald W. Hall, University of Florida

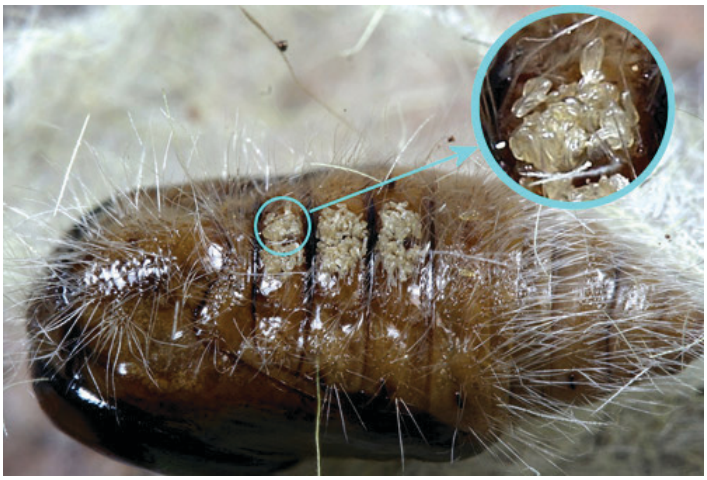
Figure 14. Mature tussock moth (*Orgyia* sp.) pupa with spatulate setae.
Credits: Donald W. Hall, University of Florida

Adults

Adults are dimorphic. Males are small, relatively dull-colored moths with prominent bipectinate antennae. At rest, they hold their first pair of legs in an outstretched position. The genus name *Orgyia* (Greek for "the length of the outstretched arms" [Borror 1960]), is based on this pose. Wingspreads of *Orgyia* species are 2.0–3.5 cm (0.78–1.4 in).


Figure 15. Male fir tussock moth (*Orgyia detrita*).
Credits: Donald W. Hall, University of Florida

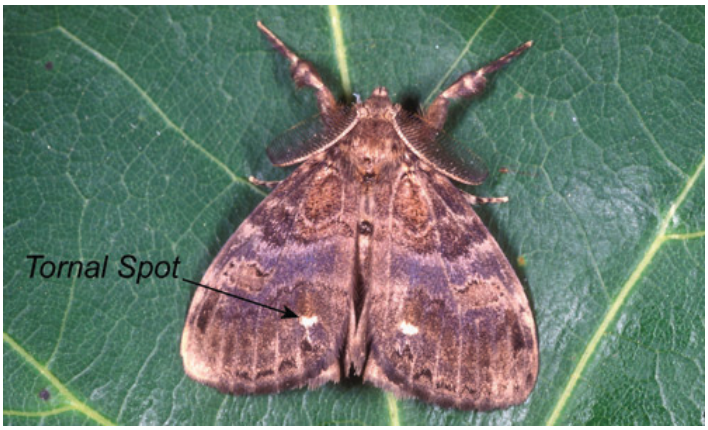

Figure 16. Male whitemarked tussock moth (*Orgyia leucostigma*). Note purple tint on wings and white tornal spot.
Credits: Lyle Buss, University of Florida

For photographs of pinned and spread specimens of males of the Lymantriinae, see Ferguson (1978). Males are difficult to distinguish, but fresh specimens of *Orgyia leucostigma* and *Orgyia definita* have a purplish tint that is lacking in *Orgyia detrita*. *Detrita* also lacks the whitish tornal spot of *leucostigma* and *definita* (Ferguson 1978).

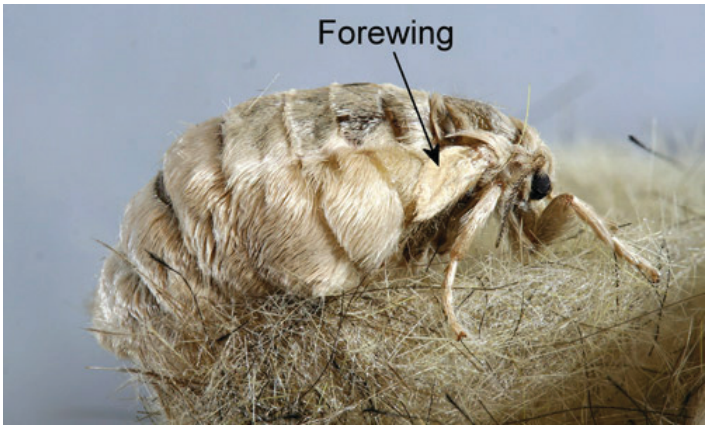

Figure 17. Female fir tussock moth (*Orgyia detrita*)
Credits: Donald W. Hall, University of Florida

The literature frequently describes the females as being wingless. Actually, they are brachypterous (short-winged) but cannot fly. At present, females can be identified to species only by association with their respective larvae (or in the case of Florida *Orgyia detrita,* by association with their egg masses).

Life Cycle and Biology

Orgyia detrita is univoltine (one generation per year), while the other two species are bivoltine in Florida (Foltz 2006). In Florida, the overwintering eggs begin to hatch in late February. After hatching, the young larvae feed on the remaining egg mass and then spin a silk thread that they use to "balloon" for dispersal (Thurston 2002). Because adult females are flightless, ballooning by young larvae is the

major mode of dispersal. Ballooning is also important given their propensity for spinning cocoons off their host plants (i.e., on buildings, fences, and other artificial objects).

Figure 18. Newly-hatched larvae of the fir tussock moth (*Orgyia detrita*).
Credits: Donald W. Hall, University of Florida

By the second instar, the larvae are already recognizable because of their short hair pencils. Young larvae eat holes in leaves. Older larvae are leaf-edge feeders.

Figure 19. Second instar fir tussock moth larva (*Orgyia detrita*).
Credits: Donald W. Hall, University of Florida

Caterpillars reach maturity and wander in search of sites to spin their cocoons in early April in Florida.

Adults emerge from mid-April to early May. The flightless females remain on their cocoons and release a sex pheromone to attract males. The sex pheromones of *Orgyia detrita* and *Orgyia leucostigma* have been characterized (Grant et al. 2003, Gries et al. 2003).

After mating, the females lay a mass of eggs directly on the cocoon and cover them with a protective covering. *Detrita* and *definita* females cover their eggs with a secretion and then rub setae from their bodies onto the secretion to form a protective layer over the eggs. *Leucostigma* females cover their eggs with a frothy secretion but do not cover the secretion with setae (Ferguson 1978). The egg stage is the overwintering stage for all three species.

Figure 20. Female fir tussock moth (*Orgyia detrita*) applying secretion to her egg mass.
Credits: Donald W. Hall, University of Florida

Figure 21. Female fir tussock moth *(Orgyia detrita*) rubbing setae from her abdomen onto her egg mass.
Credits: Donald W. Hall, University of Florida

Figure 22. Fir tussock moth (*Orgyia detrita*) cocoon with egg mass covered with setae from female's abdomen.
Credits: Donald W. Hall, University of Florida

Figure 23. Female whitemarked tussock moth (*Orgyia leucostigma*) on egg mass.
Credits: Jerry F. Butler, University of Florida

Host Plants

Orgyia detrita: Although the common name is "fir tussock moth", the only documented hosts are oaks and bald cypress (*Taxodium distichum)* (Ferguson 1978).

Orgyia leucostigma: Polyphagous. Heppner (2003) listed plants belonging to 116 genera that have been reported as hosts. A few common hosts include oak, cherry, hackberry, and willow.

Orgyia definita: Only willow (*Salix* sp.) has been confirmed as a host in Florida, but other host plants are also likely (Heppner 2003). Common hosts in other parts of its range include oak, maple, hackberry, birch, and willow (Wagner 2005).

Medical Importance

The medical importance of *Orgyia* species caterpillars is well-documented in the scientific (Diaz 2005, Gilmer 1925, Goldman et al. 1960, Knight 1922) and clinical dermatology (Hossler 2009 & 2010) literature. Pruritic (itching) dermatitis due to tussock moth caterpillars has been reported to be a problem at child day-care centers and elementary schools in Florida (Atrubin et al. 2012, Atrubin & Granger 2006, Cruse et al. 2007). Contact with the cocoons produces the same symptoms.

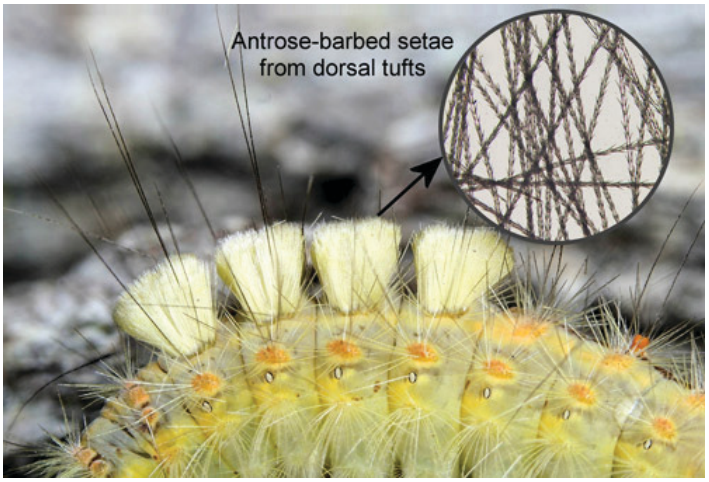

Figure 24. Tussocks of the fir tussock moth (*Orgyia detrita*). (Inset: photomicrograph of antrose [distally projecting] barbs on urticating setae of the tussocks).
Credits: Donald W. Hall, University of Florida

The caterpillars may be contacted when they drop from the host trees or when they wander from the trees in search of a place to spin their cocoons. Homeowners develop dermatitis from contact with the cocoons while removing them from the soffits of houses. Hairs in the cocoons retain their urticating capability for up to a year or longer.

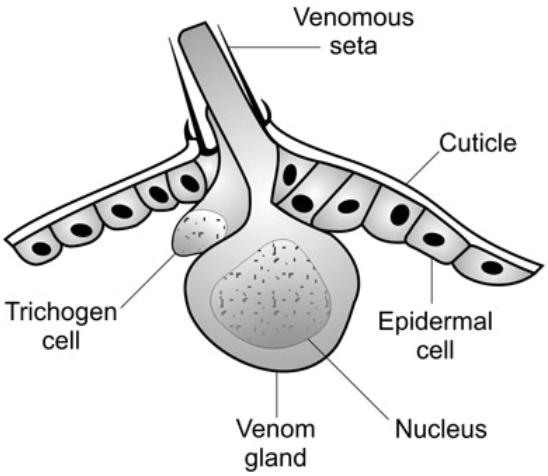

Figure 25. Diagram of urticating seta and associated venom gland of whitemarked tussock moth (*Orgyia leucostigma*).
Credits: Jane C. Medley, University of Florida

Most of the urticating hairs are in the dorsal tussocks of the caterpillars (Knight 1922), but a few are also found on the lateral verrucae and intermingled with the black plume hairs of the hair pencils (Gilmer 1925). Gilmer (1925) conducted histological studies of the urticating setae of *Orgyia leucostigma* and found that each seta has a venom gland at its base. The venom has not been adequately characterized.

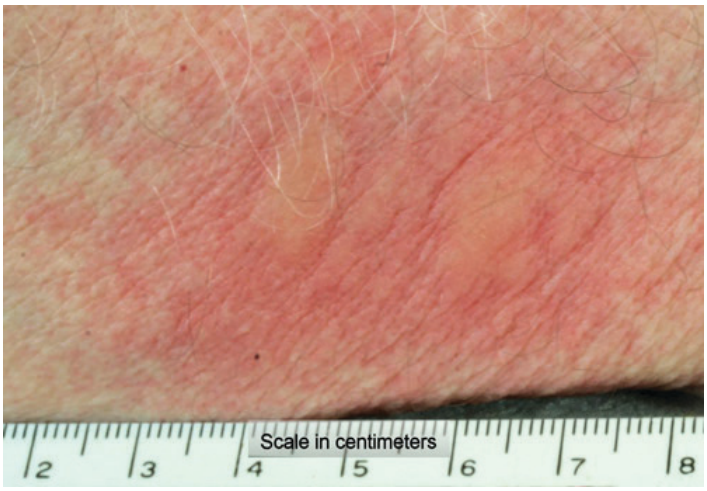

Figure 26. Pruritic welts and erythema resulting from rubbing hairs from the dorsal tussocks of the fir tussock moth (*Orgyia detrita)* onto the author's forearm.
Credits: Donald W. Hall, University of Florida

Welts resulting from contact with *Orgyia* hairs usually appear within minutes and subside by the next day, but itching and erythema commonly continue for another day or two. People apparently vary somewhat in their sensitivity to *Orgyia* species hairs. Goldman et al. (1960) studied the histopathology of a sensitive person and reported perivascular concentrations of eosinophils and leucocytes beneath the irritated areas.

Natural Enemies

Predators

Tussock moth larvae have various natural enemies. Medina and Barbosa (2002) looked at predation of small and large *Orgyia leucostigma* larvae in a temperate forest and suggested that birds were the major predators of large larvae but most mortality of smaller larvae was probably due to failure to find a suitable host during ballooning dispersal and also possibly to predation by invertebrate predators in the leaf litter. Large ground beetles (Henn et al. 2009) and *Polistes* paper wasps (Castellanos et al. 2011) have also been reported to attack the larvae up in the trees.

Pathogens

Orgyia caterpillars are infected by nuclear polyhedrosis viruses (*Baculovirus*) (Cunningham 1972) and cytoplasmic polyhedrosis viruses (*Cypovirus*) (Hayashi and Bird 1968). Those infected with nuclear polyhedrosis virus typically die in a characteristic pose—hanging limp by their prolegs.

Figure 27. Fir tussock moth caterpillar (*Orgyia detrita*) exhibiting pose typical of nuclear polyhedrosis virus (*Baculovirus*) infection.
Credits: Donald W. Hall, University of Florida

Parasitoids

Larvae and pupae are killed by various parasitoids. Foltz (personal communication) counted egg masses on cocoons and found that there were far less than the 50 percent that would be expected based on a 50:50 ratio of females to males obtained by laboratory rearings. In the year 2000, only 70 of 730 (9.6%) cocoons he examined had egg masses, suggesting a high rate of mortality. He has suggested that levels of parasitism of pupae often approach 50 percent (Foltz 2004, 2006).

Parasitoids of *Orgyia detrita* and O*rgyia definita* have not been well-studied, but those of *Orgyia leucostigma* are well documented. There is little doubt that *Orgyia detrita* and *Orgyia definita* also have many parasitoids.

Arnaud (1978, pp. 632–633) listed the following tachinid parasitoids of *Orgyia leucostigma*: *Bessa selecta* (Meigen), *Carcelia amplexa* (Coquillet), *Carcelia perplexa* Sellers, *Carcelia yalensis* Sellers, *Compsilura concinnata* (Meigen), *Drino inconspicua* (Meigen)*, *Euphorocera claripennis* (Macquart), *Euphorocera edwardsii* (Williston), *Exorista lobelia* Coquillet (currently *Nilea lobelia* [Coquillet]), *Exorista mella* Walker, *Leshenaultia* spp., *Lespesia aletiae* (Riley), *Lespesia frenchii* (Williston), *Patella leucaniae* (Coquillet), *Phorocera* spp., *Sisyropa* spp., *Winthemia datanae* (Townsend), and *Winthemia quadripustulata* (Fabricius).

*This species is not currently recorded from N.A. north of Mexico (O'Hara 2012).

Names from Arnaud (1978) have been updated by O'Hara and Wood (2004) and O'Hara (2012).

Figure 28. Tachinid puparium from *Orgyia* sp. larva.
Credits: Donald W. Hall, University of Florida

Orgyla definita

Apanteles diacrisiae Gahan (Braconidae)	(p. 245)
Phobocampe pallipes (Provancher) (Ichneumonidae)	(p. 660)
Hyposoter fugitivus (Say) (Ichneumonidae)	(p. 677)
Elachertus hyphantriae Crawford (Ichneumonidae)	(p.980)

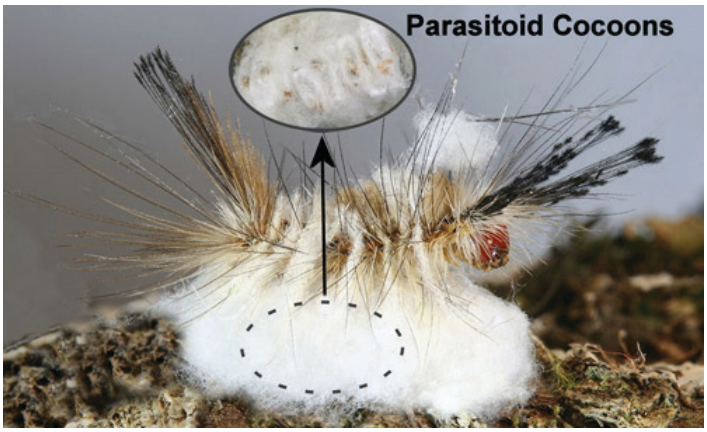

Figure 29. Fir tussock moth caterpillar (*Orgyia detrita*) parasitized by wasps. The parasitoid cocoons are cloaked by the silk covering (spun by the wasp larvae) beneath the parasitized caterpillar (Inset: parasitoid cocoons from under silk covering–wasps have already emerged).
Credits: Donald W. Hall, University of Florida

Orgyla leucostigma

Bracon xanthonotus Ashmead (Braconidae)	(pp. 168–169)
Apanteles acronyctae (Riley) (Braconidae)	(p. 242)
Apanteles delicatus Howard (Braconidae)	(p. 245)
Apanteles diacrisiae Gahan (Braconidae)	(p. 245)
Apanteles hyphantriae Riley* (Braconidae)	(p. 248)
Meteorus autographae Muesebeck (Braconidae)	(p. 282)
Meteorus hyphantriae Riley* (Braconidae)	(p. 283)
Meteorus versicolor (Wesmael) (Braconidae), introduction from Europe	(p. 285)
Iseropus coelebs (Walsh)* (Ichneumonidae)	(p. 332)
Iseropus stercorator orgyiae (Ashmead) (Ichneumonidae)	(p. 332)
Itoplectus conquisitor (Say)* (Ichneumonidae)	(p. 340)
Ephialtes annulicornus componotus (Davis) (Ichneumonidae)	(p. 342)
Coccygomimus maurus (Cresson) (Ichneumonidae)	(p. 345)
Theronia atalantae fulvescens (Cresson) (Ichneumonidae)	(p. 347)
Gelis insolitus (Howard) (Ichneumonidae), hyperparasite	(p. 406)
Gambrus canadensis burkei (Viereck) (Ichneumonidae)	(p. 449)
Orgichneumon calcatorius (Thunberg) (Ichneumonidae)	(p.518)
Casinaria limenitidis (Howard) (Ichneumonidae)	(p. 637)
Phobocampe pallipes (Provancher) (Ichneumonidae)	(p. 660)
Psychophagus omnivorus (Walker) (Pteromalidae), introduction from Europe	(p. 807)
Habrocytus thyridopterigis Howard (Pteromalidae)	(p.813)
Tritneptis hemerocampae Viereck (Pteromalidae)	(p. 825)
Syntomosphyrum esurus (Riley) (Eulophidae)	(p. 1004)
Syntomosphyrum orgyiazele Burks (Eulophidae)	(p. 1005)
Telenomus dalmani (Ratzeburg) (Scelionidae)	(p. 1168)
*Listed range includes Florida.	

Control

Control of the caterpillars is difficult because by the time they are migrating from the trees, it is too late. In Florida, feeding damage to large trees by *Orgyia* species does not usually harm the trees. However, they may occasionally be sufficiently numerous to completely defoliate large trees. Also, large numbers of larvae blown onto small landscape trees may result in severe defoliation.

Figure 30. Large live oak tree defoliated by fir tussock moth (*Orgyia detrita*) caterpillars.
Credits: Lyle Buss, University of Florida

If control measures are required, chemical insecticide or *Bacillus thuringiensis* applications recommended for control of other caterpillars should be effective. For current control recommendations, contact your local UF/IFAS Extension agent.

Cultural Entomology

Insects are very popular in human culture. Images of butterflies and moths are common in movies, art, jewelry, and fabrics. Although the fir tussock moth is not a highly familiar moth even to most entomologists, an image of an adult male does appear in a popular design used on ornamental paper, wall art, journal covers, purses, and fabric (Tim Holtz, personal communication).

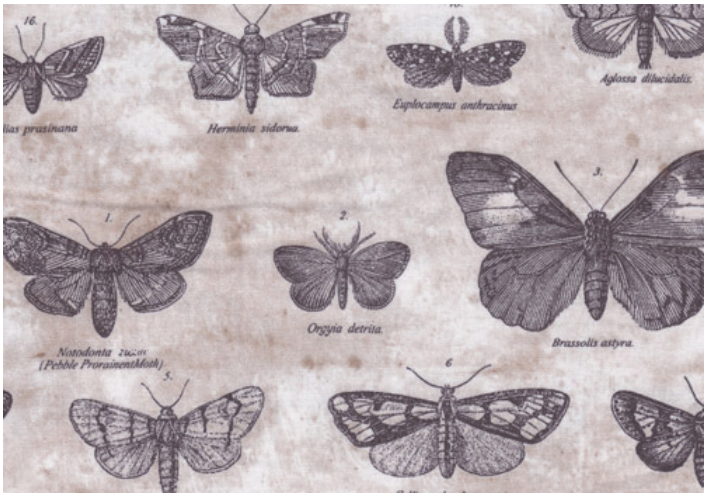

Figure 31. Fabric with image of *Orgyia detrita* male. © ECLECTIC ELEMENTS (PWTH004.TAUPE Butterflight).
Credits: Tim Holtz.com, used with permission

Selected References

Arnaud PH. 1978. A Host-Parasite Catalog of North American Tachinidae (Diptera). United States Department of Agriculture Miscellaneous Publication 1319. Washington, D.C. (Accessed 21 March 2020)

Atrubin D, Granger K. April 28, 2006. Contact dermatitis in daycare facilities. EPI-NOTES Disease Surveillance Newsletter. Hillsborough County (Florida) Health Department.

Atrubin D, Wansbrough L, Cruse K, Stanek D, Blackmore C. 2012. Caterpillar-associated rashes in children - Hillsborough County, Florida, 2011. Morbidity and Mortality Weekly Report 61(12): 209–212. (Accessed 21 March 2020)

Beadle D, Leckie S. 2012. Petersen Field Guide to Moths of Northeastern North America. Houghton Mifflin Publishing Company. New York, New York. 611 pp.

Borror DJ. 1960. Dictionary of Word Roots and Combining Forms. Mayfield Publishing Company. Palo Alto, California. 134 pp.

Castellanos I, Barbosa P, Caldas A. 2011. Dropping from host plants in response to predators by a polyphagous caterpillar. Journal of the Lepidopterists Society 65(4): 270–272.

Cruse K, Atrubin D, Loyless T. 2007. Rash illness outbreaks at daycare facilities associated with the tussock moth caterpillar, April 2004 and April 2005. Florida Journal of Environmental Health 195:14–17.

Cunningham JC. 1972. Preliminary studies of the nuclear-polyhedrosis viruses infecting the white-marked tussock moth, . Information Report. Insect Pathology Research Institute. Department of the Environment. Canadian Forestry Service. Sault Ste. Marie, Ontario, Canada. 23 pp. + figures. (Accessed 21 March 2020)

Diaz JH. 2005. The evolving global epidemiology, syndromic classification, management, and prevention of caterpillar envenoming. American Journal of Tropical Medicine and Hygiene 72(3): 347–357.

Ferguson DC. 1978. The Moths of America North of Mexico Including Greenland. Fascicle 22.2 Noctuoidea: Lymantriidae. E.W. Classey, Ltd. London. 110 pp.

Foltz JL. 2004. Tussock moth caterpillars in Florida. (Accessed 21 March 2020)

Foltz JL. 2006. Tussock moth caterpillars in north central Florida. Integrated Pest Management Florida. IFAS Extension. University of Florida. (Accessed 21 March 2020)

Gilmer PM. 1925. A comparative study of the poison apparatus of certain lepidopterous larvae. Annals of the Entomological Society of America 18: 203–239.

Godfrey GL. 1987. Lymantriidae. *In* Stehr FW. Immature Insects. Kendall/Hunt Publishing Company. Dubuque, Iowa. pp. 544–548.

Goldman L, Sawyer F, Levine A, Goldman J, Goldman S, Spinanger B. 1960. Investigative studies of skin irritations from caterpillars. Journal of Investigative Dermatology 34(1): 67–79.

Grant GG, Slessor KN, Wei L, Abou-zaid MM. 2003. (Z,Z)-6,9-heneicosadien-11-one, labile sex pheromone of the whitemarked tussock moth. Journal of Chemical Ecology 29(3): 589–601.

Gries R, Khaskin G, Khaskin E, Foltz JL, Schaefer PW, Gries G. 2003. Enantiomers of (Z,Z)-6,9-heneicosadien-11-ol: Sex pheromone components of *Orgyia detrita*. Journal of Chemical Ecology 29(10): 2201–2212.

Hayashi Y, Bird HT. 1968. Properties of a cytoplasmic-polyhedrosis virus from the white-marked tussock moth. Journal of Invertebrate Pathology 12(1): 140.

Henn T, Weinzierl R, Koehler PG. 2009. Beneficial Insects and Mites. ENY-276. IFAS Extension. University of Florida. Gainesville, Florida. 15 pp. + Figures.

Heppner JB. 2003. Lepidoptera of Florida. Part 1. Introduction and Catalog. Volume 17 of Arthropods of Florida and Neighboring Land Areas. Division of Plant Industry. Florida Department of Agriculture and Consumer Services. Gainesville, Florida. 670 pp.

Hossler EW. 2009. Caterpillars and Moths. Dermatologic Therapy 22: 353–366.

Hossler EW. 2010. Caterpillars and Moths. Part II. Dermatologic manifestations of encounters with Lepidoptera. Journal of the American Academy of Dermatology 62(1): 13–28.

Knight HH. 1922. Observations on the poisonous nature of the white-marked tussock-moth (*Hemerocampa leucostigma* Smith and Abbott). The Journal of Parasitology 8(3): 133–135.

Krombein KV, Hurd PD, Jr., Smith DR, Burks BD. 1979. Catalog of Hymenoptera in America North of Mexico. Volume 1. Symphyta and Apocrita (Parasitica). Smithsonian Institution Press. Washington, D.C. 1198 pp. (Accessed 21 March 2020)

Medina RF, Barbosa P. 2002. Predation of small and large *Orgyia leucostigma* (J.E. Smith) (Lepidoptera: Lymantriidae) larvae by vertebrate and invertebrate predators. Environmental Entomology 31: 1097–1102.

Mosher E. 1916. A classification of the Lepidoptera based on characters of the pupae. Bulletin of the Illinois State Laboratory of Natural History 12:17–159. (Accessed 21 March 2020)

O'Hara JE, Wood DM. 2004. Catalogue of the Tachinidae (Diptera) of North America north of Mexico. Associated Publishers. Gainesville, Florida. 410 pp.

O'Hara JE. 2012. Update of Tachinid Names in Arnaud (1978). (Last update: 3 December 2013) (Accessed 21 March 2020)

Orgia detrita entry at North American Moth Photographer's Group. Mississippi Entomological Museum, Mississippi State University, Starkville, MS. (Accessed 21 March 2020)

Orgia definita entry at North American Moth Photographer's Group. Mississippi Entomological Museum, Mississippi State University, Starkville, MS. (Accessed 21 March 2020)

Orgia leucostigma entry at North American Moth Photographer's Group. Mississippi Entomological Museum, Mississippi State University, Starkville, MS. (Accessed 21 March 2020)

Thurston GS. 2002. *Orgyia leucostigma* (J.E. Smith) white-marked tussock moth (Lepidoptera: Lymantriidae). pp. 201–203. *In* Mason PG, Huber JT, eds., Biological Control Programmes in Canada, 1981–2000. CABI Publishing. New York. 583 pp.

Wagner DL. 2005. Caterpillars of Eastern North America. Princeton University Press. Princeton, New Jersey. 512 pp.