Yellow-Legged Hornet: What Beekeepers Need to Know

Biology and Impact on Honey Bees

Yellow-legged hornets (YLH; *Vespa velutina* Lepeletier, previously referred to as "Asian hornets") are social insects native to Southeast Asia. Named for their distinctive yellow legs (Figure 1), they range from 17 mm to 32 mm in length. These hornets prey on many insect species, including the Asian honey bee (*Apis cerana*) and European honey bee (*A. mellifera*). In their native region, YLH coevolved with *A. cerana*, and in response, *A. cerana* have evolved effective defense strategies, such as heat-balling or shimmering behaviors (Ken et al. 2005; Tan, Li, et al. 2010; Tan, Wang, et al. 2013). This defensive behavior by *A. cerana* involves tightly clustering around a predator and raising the predator's body temperature to a lethal level without overheating themselves. While *A. mellifera* can also display such heat-balling behavior, they lack strong behavioral responses to YLH attacks and are less efficient at defending their colonies (Arca et al. 2014).

YLH form a large colony with one reproductive queen that can produce thousands of individuals each year. Their nests look like paper cones with a single entrance, and they hang high up in trees and on structures, such as barns, garages, and sheds. This species has two phases of nest construction. During spring, primary nests are built by queens to begin the colony and are about the size of a tennis ball. Once the population builds, secondary nests are built, which can far exceed the size of a basketball (Figure 2) and are usually more visible from late summer to fall (Rome et al. 2015). During colony growth in late summer or early fall, a copious amount of protein is required to feed the developing brood, and a large portion of that protein is procured from predating on honey bee colonies (Figure 3).

Figure 1. Yellow-legged hornet (*Vespa velutina*). Size ranges from 17 mm to 32 mm long. Photo courtesy: Gilles San Martin licensed under CC BY-SA 2.0.

Figure 2. Yellow-legged hornet nest. Photo courtesy: VespaWatch on iNaturalist.

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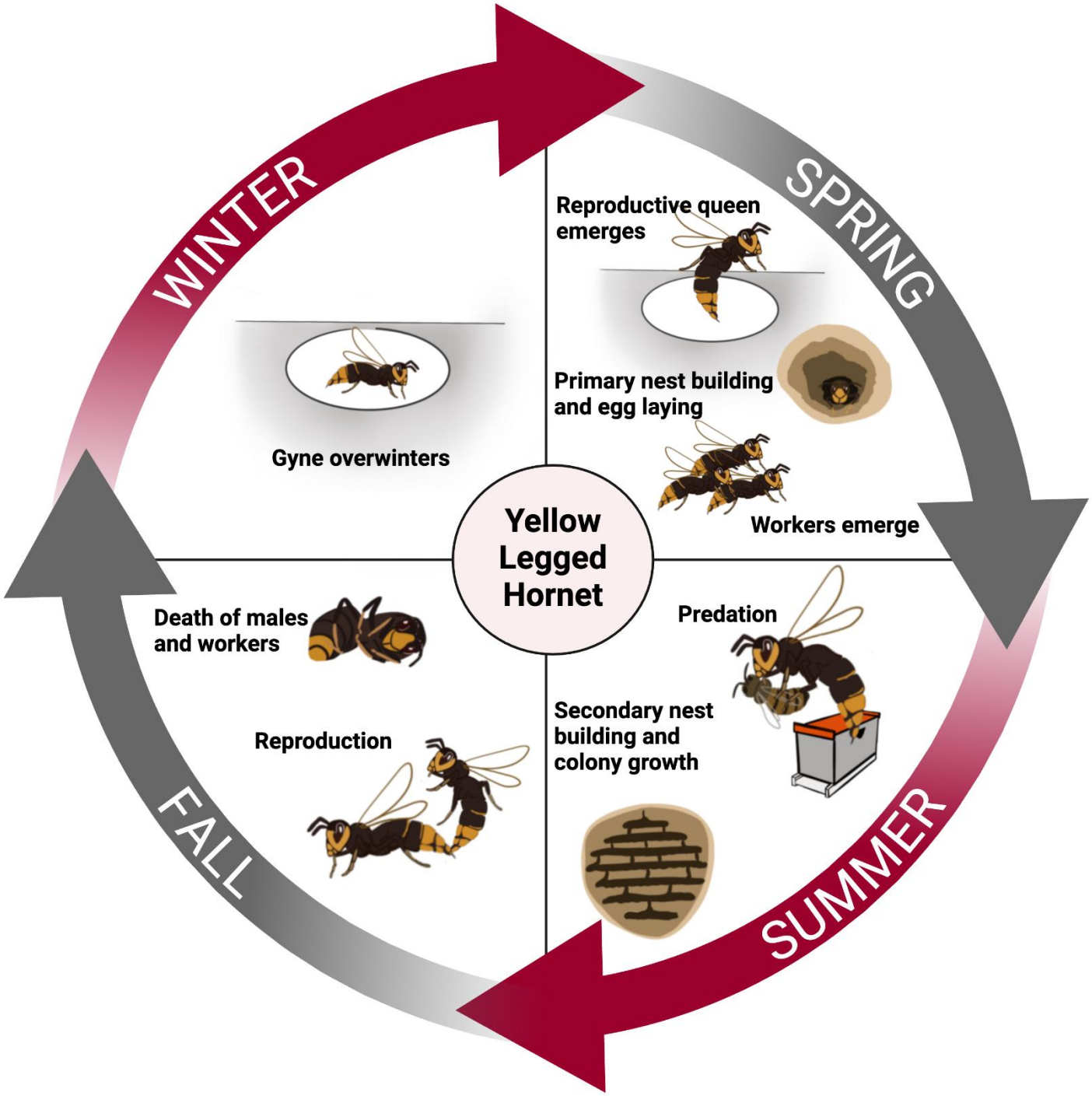

Figure 3. Life cycle of yellow-legged hornet, *Vespa velutina*. Illustrated by Bri Price based on Monceau et al. 2014.

Typically, YLH workers will hover around a honey bee colony and catch honey bee foragers that are returning to the hive (Monceau et al. 2013). Additionally, YLH presence outside a honey bee colony can reduce the number of exiting foragers. This reduction in forager bees and foraging behavior impact normal colony function, brood rearing, and food stores, and some researchers suggest that this may lead to colony collapse (Arca et al. 2014).

Honey bees can comprise as much as two-thirds of a YLH diet, and these hornets directly threaten managed and feral honey bee colonies. Since millions of honey bee colonies are utilized in crucial crop pollination services, it is important to prevent YLH from establishing in the United States. YLH also prey on other beneficial insects, such as flies and social wasps (Rome et al. 2021) and negatively impact abundance and behavior of pollinators due to their

hunting behavior (Rojas-Nossa and Calviño-Cancela 2020).

Even though YLH prey on honey bee colonies, it should not be confused with the northern giant hornet (NGH; *Vespa mandarinia*) that were found in 2020 and 2021 in Washington State. NGH were declared eradicated from the United States in 2024 by the Washington State Department of Agriculture (WSDA 2024). This Extension publication aims to provide an overview of YLH, including current status, biology, tips for identification, and comparison to other species, and urges beekeepers, naturalists, agriculturalists, pest consultants, gardeners, or concerned citizens to report any sightings to the WSDA and Washington State University Bee Program.

Status as of 2025 and Estimated Habitat Suitability in the US

Yellow-legged hornets (YLH) include at least 13 color forms (Perrard et al. 2014). YLH (color form *nigrithorax*) were recently found near Savannah, Georgia, in July 2023 (Hoebeke et al. 2024). Shortly after the first sighting of YLH in Savannah, the Georgia Department of Agriculture (GDA) deployed over 300 bait traps containing grape juice and brown sugar. These bait traps were monitored weekly during subsequent months. In addition to bait traps, GDA used miniature trackers on YLH individuals; these trackers used radio frequencies to transfer data about potential nest locations, and a handful of YLH nests were located and destroyed (GDA 2024). Additionally, there were a couple more confirmed YLH sightings in November 2023 and observations of YLH preying on honey bee colonies in July 2024 in South Carolina (Hoebeke et al. 2024). *Efforts are still underway to eradicate YLH before it establishes and spreads within the United States, and the public is encouraged to report any potential findings of YLH.*

Based on species distribution modeling by Barbet-Massin et al. (2020), there may be suitable habitat for YLH in the Pacific Northwest and this region also appears to be increasingly suitable under future global climate scenarios (Figures 4 and 5). If this hornet becomes established in the US or is introduced to the western US, it will have a severe and damaging impact on honey bee populations and the beekeeping industry. Beekeepers, naturalists, agriculturalists, pest consultants, gardeners, and concerned citizens are a crucial line of defense by reporting sightings, locating, and identifying these hornets.

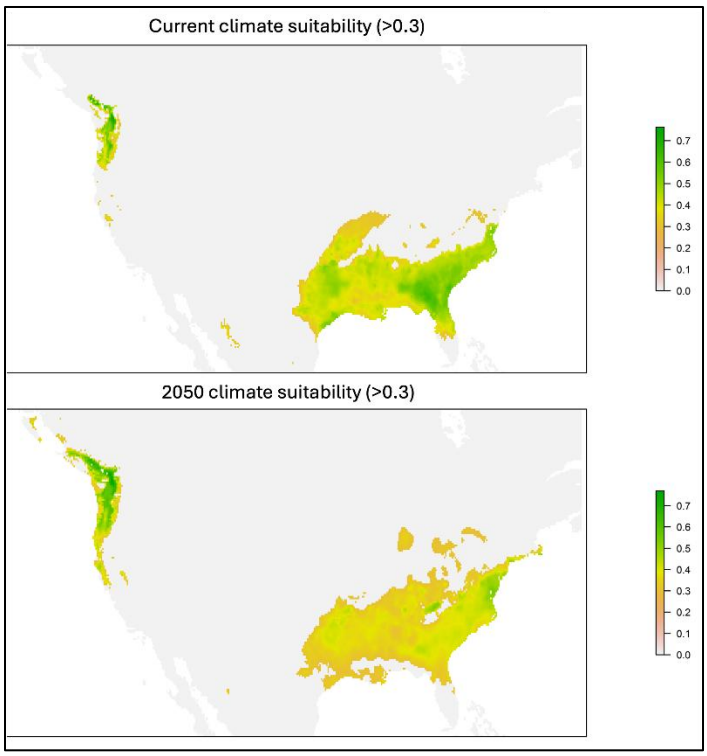

Figure 4. Consensus of current and future climate suitability of the yellow-legged hornet (*Vespa velutina*) in the United States predicted from species distribution modeling in Barbet-Massin et al. (2020). Figure courtesy: Franck Courchamp, Université Paris Saclay.

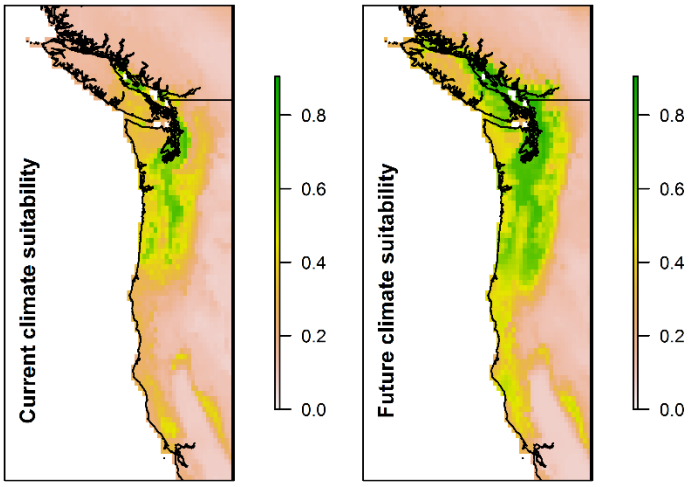

Figure 5. Consensus of current and future climate suitability of the yellow-legged hornet (*Vespa velutina*) in the Pacific Northwest region of the United States, predicted from species distribution modeling in Barbet-Massin et al. (2020). Figure courtesy: Franck Courchamp, Université Paris Saclay.

Identifying Characteristics of the Yellow-Legged Hornet

Several social wasps such as *Vespula* spp. (yellow jackets) and *Polistes* spp. (paper wasps) may appear similar to YLH (Figure 9), but many of them are valuable pollinators. Some species of social wasps such as yellow jackets and bald-faced hornets are known to raid honey bee colonies but can be visibly differentiated from YLH. Yellow jackets (*Vespula* spp.) have a larger portion of yellow stripes or coloration across their bodies (Figure 7 and Figure 9). Bald-faced hornets (*Dolichovespula maculata*) are mostly black with white markings (Figure 6 and Figure 9). Yellow-legged hornets have a solid yellow stripe on the fourth abdominal segment, and the bottom half of the insect's legs are yellow (Figures 7, 8, and 9).

Figure 6. Bald-faced hornet, *Dolichovespula maculata*. Photo courtesies: Joseph Berger, Bugwood.org.

Reporting Yellow-Legged Hornet Sightings

Wasp or hornet stings can occasionally cause anaphylaxis or life-threatening allergic reactions (Golden et al. 2006). While YLH are not considered aggressive toward people, they will likely protect their nests or food sources. If you think you may have observed a yellow-legged hornet and have carefully compared it to the look-alike species without putting yourself at risk of stings, it should be reported to the WSDA (hornets@agr.wa.gov) and the WSU Bee Program (entomology.bees@wsu.edu) immediately. If possible, please submit a photo of the suspected hornet along with your report.

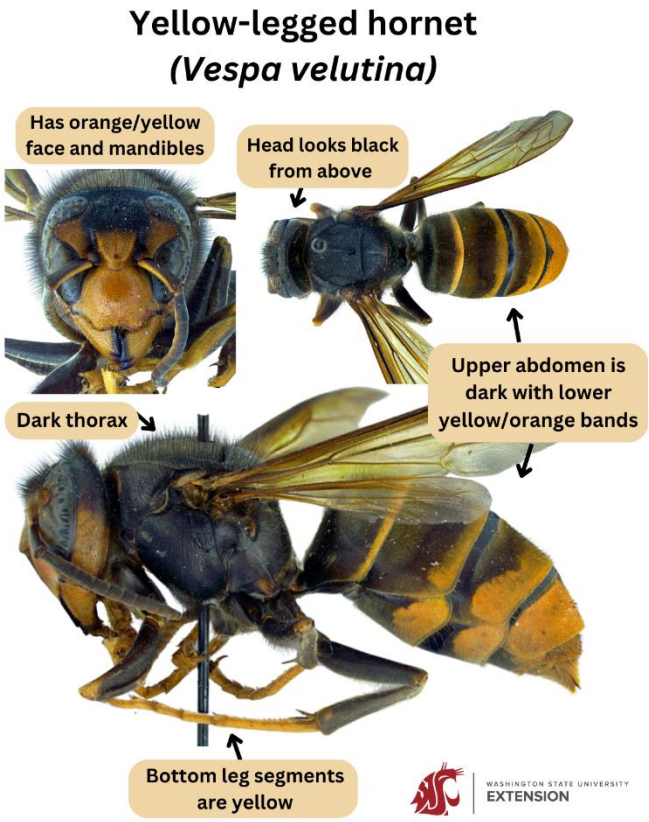

Figure 7. Morphological characteristics that help differentiate yellow-legged hornet (*Vespa velutina*) from other species. Photo courtesies: Allan Smith-Pardo, Invasive Hornets, USDA APHIS PPQ, Bugwood.org.

Figure 8. Yellow-legged hornet, *Vespa velutina*, next to *Vespula* spp. Photo courtesy: VespaWatch on iNaturalist.

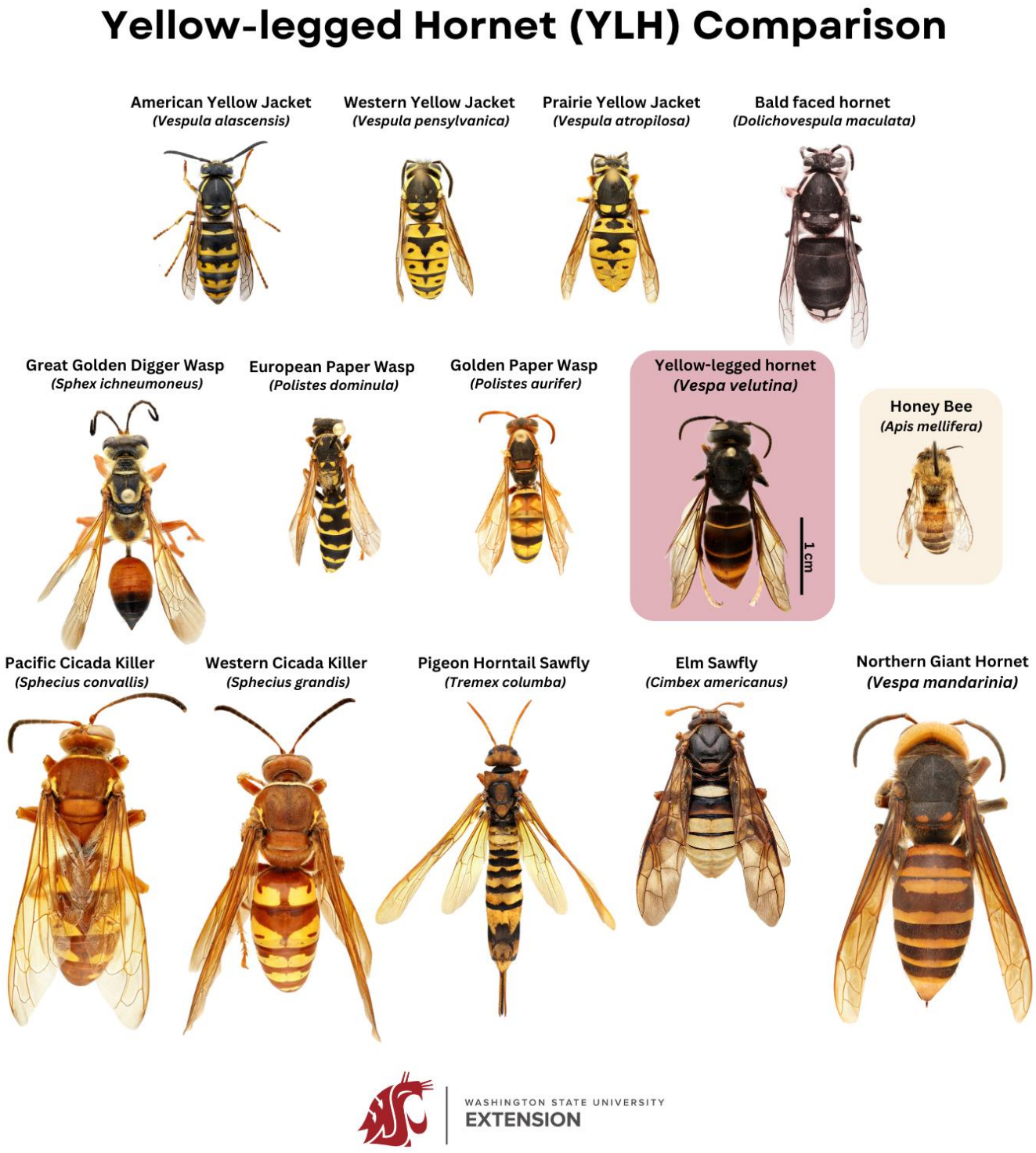

Figure 9. Yellow-legged hornet, *Vespa velutina* (highlighted in pink), shown next to a honey bee, *Apis mellifera* (highlighted in yellow), and look-alike species likely to inhabit the Pacific Northwest region of the United States. These specimens are accurately scaled for size comparison, although size should not be the only identifying feature considered. *Note*: The Northern Giant Hornet (*Vespa mandarinia*) is only included for size comparison and was declared eradicated from the United States in 2024 by the Washington State Department of Agriculture. Photo courtesies: Hanna Royals, Museum Collections, Hymenoptera, USDA APHIS PPQ, Bugwood.org; and Thomas Shahan, Oregon Department of Agriculture, flickr.com.

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