Hogs and Hazelnuts: adaptively managing pest spillover in the agricultural-wildland matrix

Cal Penkauskas¹, Alejandro Brambila¹, Taylor Larson², Betsey Miller³, Drew Donahue¹, Dr. Lauren Hallett¹

¹University of Oregon, ²My Brothers' Farm, ³Oregon State University

Imperiled oaks harbor filbertworm, the key economic pest for domestic hazelnuts domestic hazelnuts

• CORVALLIS

• CORVALLIS

• CORVALLIS

• W

• EUGENE

• Williamette Valley

• Williamette Valley

• Williamette Valley

• Historical Oak Habitat

• Remnant Oak Patches

• Hazelnut Orchards

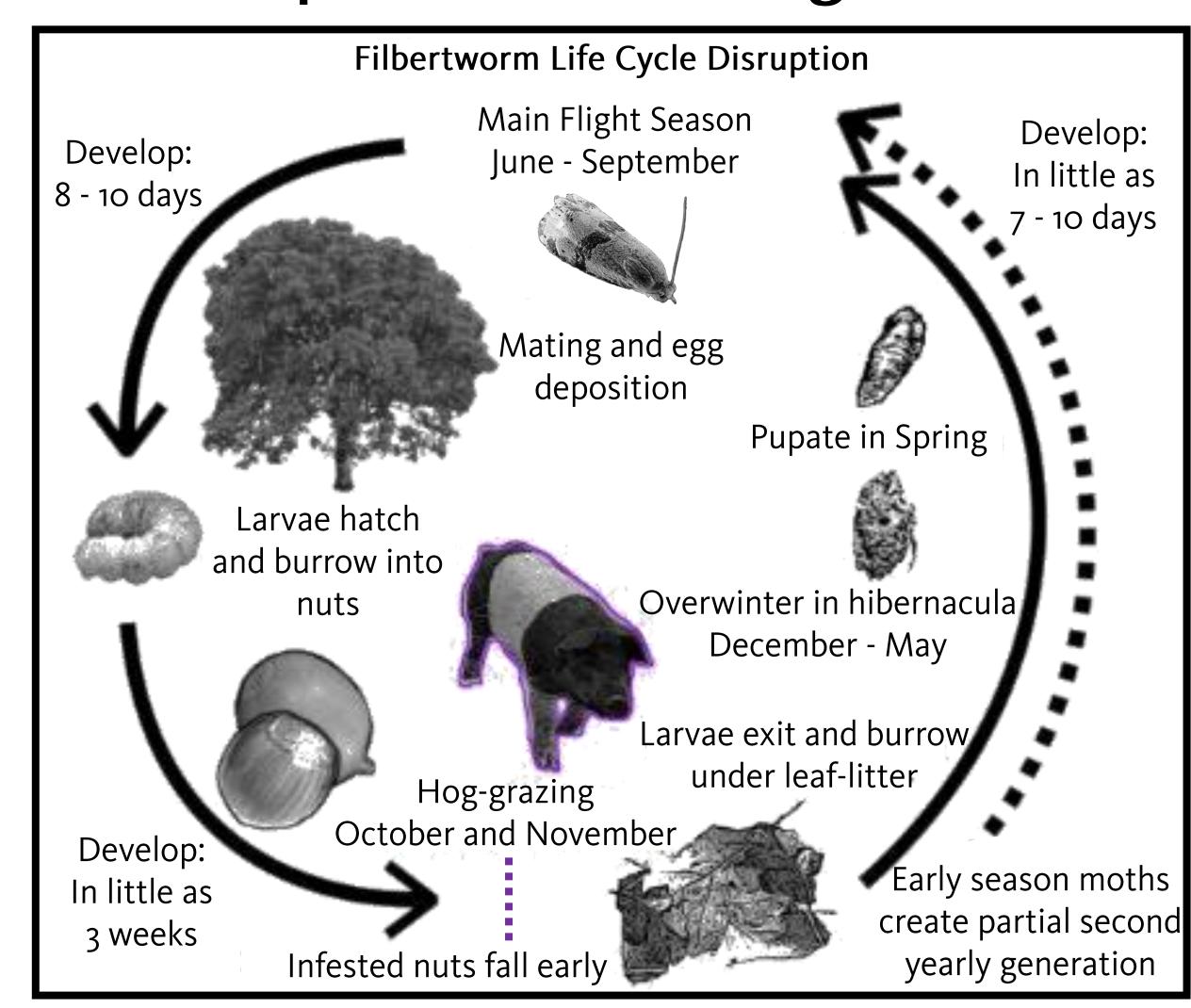
Oaks are dispersed throughout a matrix of developed agricultural

land. This map shows historical (>1850) and remnant (2016) oak

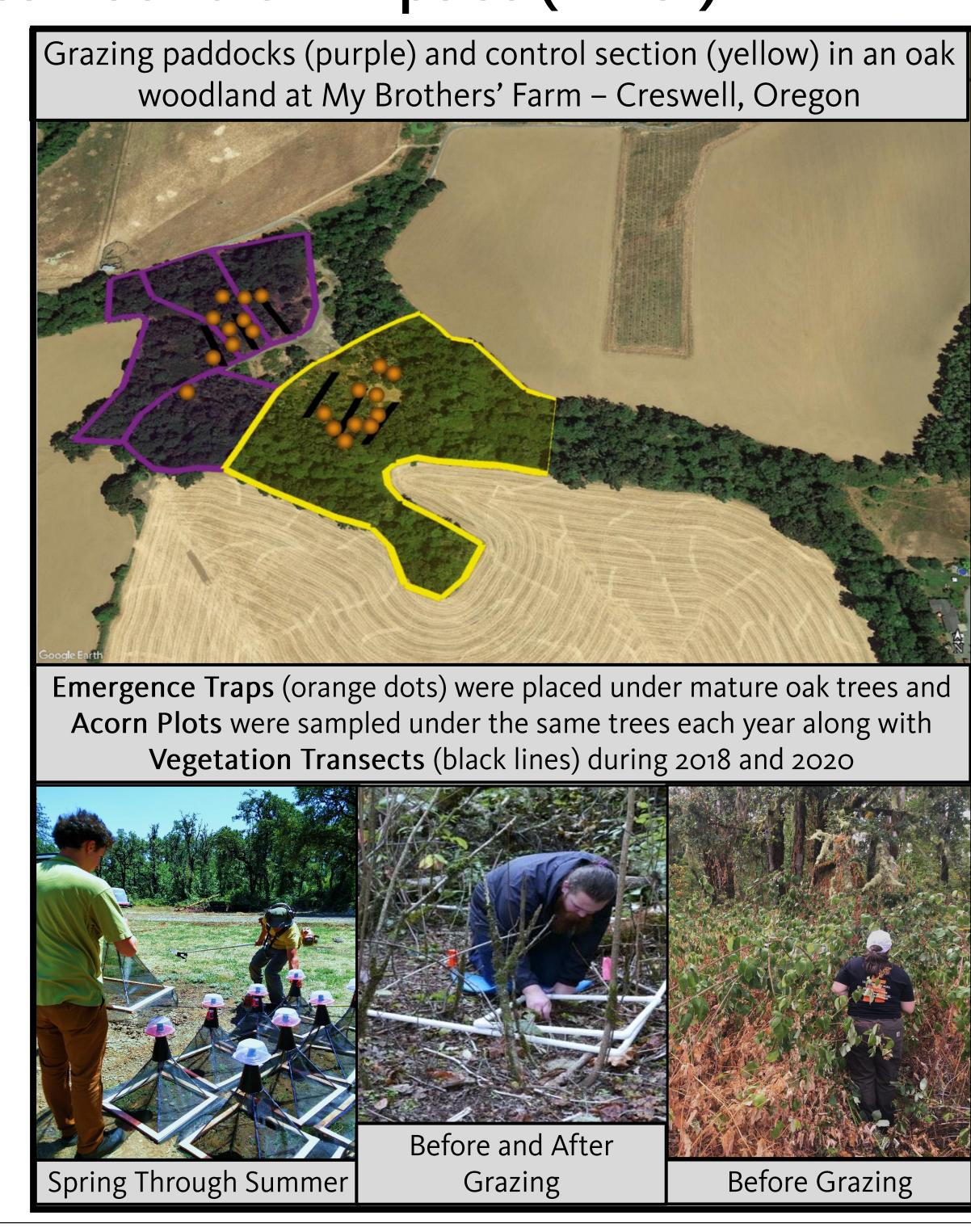
habitat, and current hazelnut orchards (2020)

- Pest spillover from wildlands to farms can create conflict between habitat conservation and agricultural production
- Oregon white oaks (Quercus garryana) comprise one of the most imperiled habitats in Oregon and are mostly on private land
- The Willamette Valley in Oregon accounts for almost all of the hazelnuts (Corylus avellana) grown nationwide
- Spillover of the native filbertworm moth (*Cydia latiferreana*) from remnant habitat incentivizes oak
 removal to reduce pesticide cost and decrease crop loss

Experimental design: Before-After-Control-Impact (BACI)



- Emergence traps were sampled for filbertworm every two weeks throughout the flight season
- Starting in 2018, ≈ 20 hogs were allowed to forage for 4-5 days in each 2-acre paddock



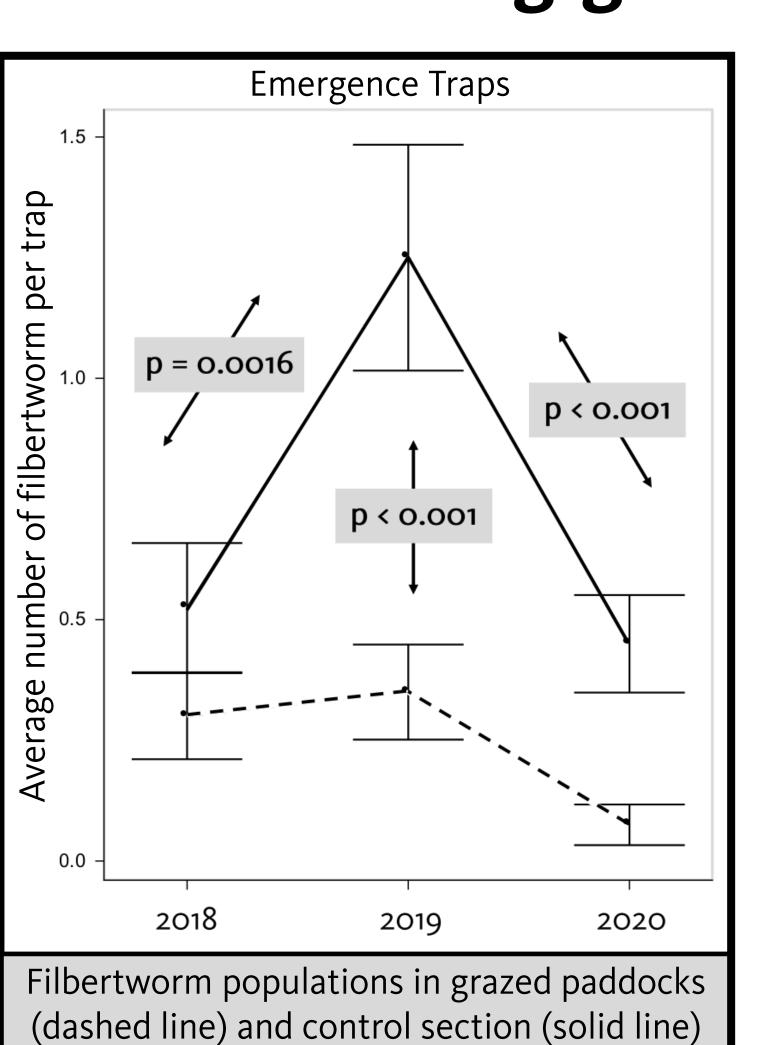
Grazing is a promising tool for adaptively managing pests on farms

- Pest management strategies that utilize known disturbance regimes can help align conservation principles with economic goals
- Disrupting the life cycle of agricultural pests with prescribed grazing treatments is a growing agroforestry practice
- Successfully resolving conflicts in landscapes where agriculture and wildlands interact is increasingly important in the coming decades



Domestic hogs (Sus domesticus) have historically grazed oak habitat in other parts of the world and have significant economic and ecological potential if carefully managed

Prescribed hog-grazing reduces filbertworm pest pressure over two years



- Hogs were extremely effective at removing infested acorns with insignificant change in understory vegetation cover
- Local filbertworm populations in the grazed paddocks diverged from the control with near-zero emerging in 2020
- Increased commercial demand for nature-friendly pork and decreased pest spillover potential are economic gains for ecologically diversifying farms in the Willamette Valley
- Although hog-grazing may not be practical in some cases, prescribed burns and alternative grazers such as goats could be contextual tools for further adaptively managing filbertworm

- AliNiazee, M. T. (1998). Ecology and Management of Hazelnut Pests. Annual Review of Entomology, 43(1), 395–419.

https://doi.org/10.1146/annurev.ento.43.1.395
- Bureau of Land Management, Oregon State Office (2001) Oregon Washington State Boundary Polygon.

http://www.blm.gov/or/gis/data.php. Accessed August 2019
- Christy, J. A., & Alverson, E. R. (2011). Historical Vegetation of the Willamette Valley, Oregon, circa 1850. Northwest Science, 85(2), 93–107. https://doi.org/10.3955/046.085.020
- DLG data files (1970) Major Cities. 1970 National Atlas of the United States of America, National Mapping Program. Oregon Spatial Data Library. Accessed 12 February 2019
- Fischer, A. P., & Bliss, J. C. (2009). Framing conservation on private lands: Conserving oak in Oregon's Willamette Valley. Society and Natural Resources, 22(10), 884-900. https://doi.org/10.1080/08941920802314926
- C. G., Hebb, D., Bishop, S. D., & Nichols, D. (2007). Rotationally Grazing Hogs in Apple Orchard Floor Management in Organic Apple Orchards. Acta Horticulturae, 737, 71–78. https://doi.org/10.17660/ActaHortic.2007.737.9
- Kagan J, Zaret K, Bernert J, and Henderson E (2018) 2018 Oregon Habitat Map. Oregon Biodiversity Information Center, Institute

ferreana) mating pro.2019.04.030 stail/statistical-Hazelnut Industry.







