

# Western Bark Beetle Research Group

## Accomplishments Report: Jan. 2010-Dec. 2010

### Group Products

#### Publications

- (1) **Bentz, B. J., Régnière, J., Fettig, C. J., Hansen, E. M., Hayes, J. L., Hicke, J. A., Kelsey, R. G., Negrón, J. F., and Seybold, S. J.** 2010. Climate change and bark beetles of the western US and Canada: Direct and indirect effects. *BioScience* 60:602–613. doi:10.1525/bio20106086
- (2) **Hansen, E. M., Negrón, J. F., Munson, A. S., and Anhold, J. A.** 2010. A retrospective assessment of partial cutting to reduce spruce beetle-caused mortality in the southern Rocky Mountains. *Western Journal of Applied Forestry* 25:81–87.
- (3) **Klepzig, K. D., Poland, T. M., Gillette, N. G., Haack, R. A., Keena, M. A., Miller, D. R., Montgomery, M. E., Seybold, S. J., and Tobin, P. C.** 2010. Forest Service R&D—Invasive insects: Visions for the future, pp. 13–21, in M. E. Dix and K. Britton (eds.). *A Dynamic Invasive Species Research Vision: Opportunities and Priorities 2009-29*. USDA Forest Service Gen. Tech. Rep. WO-79, Washington, D.C., May 2010, 130 pp.
- (4) **Lee, J. C., Hamud, S. M., Negrón, J. F., Witcosky, J. J., and Seybold, S. J.** 2010. Semiochemical-mediated flight strategies of two invasive elm bark beetles: A potential factor in competitive displacement. *Environmental Entomology* 39:642–652. doi:10.1603/EN09327

#### Contributed and Invited Presentations and Posters at Scientific Meetings and Workshops

- (1) **Bentz, B. J., Fettig, C. J., Gillette, N.E., Hansen, E. M., Hayes, J. L., Kelsey, R. G., Lundquist, J. E., Lynch, A. M., Negrón, J. F., Progar, R. A., and Seybold, S. J.** The Western Bark Beetle Research Group: Basic and application-motivated research that enhances scientific understanding and solves real-world problems, 58<sup>th</sup> Annual Meeting of the Entomological Society of America, December 15, 2010, San Diego, California (poster presentation by Fettig).
- (2) **Fettig, C. J., Hebertson, E. G., Jenkins, M. J., and Negrón, J. F.** Bark beetles and fire: what we know; what we don't know; and what we are learning. 2010 Annual Convention of the Society of American Foresters, October 27-31, 2010, Albuquerque, New Mexico (oral presentation by Fettig).

## **Media Recognition**

(1) **Bentz, B. J., Fettig, C. J., and Hayes, J. L.** Risk of beetle outbreaks rise, along with temperature, in the warming West. Interview with Yasmeen Sands and press release co-authored with her. First released by the Pacific Northwest Research Station through EurekaAlert! produced by the American Association for Advancement of Science, September 2010. Reprinted by numerous (>25) media outlets, September-December, 2010.

[http://www.eurekaalert.org/pub\\_releases/2010-09/ufsp-rob090810.php](http://www.eurekaalert.org/pub_releases/2010-09/ufsp-rob090810.php)  
<http://www.fs.fed.us/pnw/news/2010/09/beetle-outbreaks.shtml>

Examples include:

"Bark Beetles May Flourish as Earth Warms;" Northwest News Network (collaboration of radio stations in Oregon, Washington, and Idaho that serve NPR); September 9, 2010;  
<http://news.opb.org/article/12781-bark-beetles-may-flourish-earth-warms/>

"Risk of Beetle Outbreaks Rise, Along with Temperature, in the Warming West;" Science360.gov; September 9, 2010;  
<http://news.science360.gov/files/>

"Study: Warmer Climate Will Bring More Tree-Killing Beetles;" Oregon Public Broadcasting's "Ecotrope" environmental blog; September 9, 2010;  
<http://ecotrope.opb.org/2010/09/study-warmer-climate-will-bring-more-tree-killing-beetles/#more-1378>

"Study: Pine Beetle Threat Rising in Warmer West;" KTVZ (Bend, Oregon); September 8, 2010;  
<http://www.ktvz.com/oregon-northwest/24932478/detail.html>

"Pacific Northwest Forests Could Face Beetle Damage: Report;" Portland Business Journal; September 9, 2010;  
<http://portland.bizjournals.com/portland/stories/2010/09/06/daily20.html>

"Risk of Beetle Outbreaks Rise, Along with Temperature, in the Warming West;" PhysOrg.com; September 8, 2010;  
<http://www.physorg.com/news203190018.html>

## **Individual Member Products**

### **Publications**

- (1) **Adams, A. S., Adams, S. M., Currie, C. R., Gillette, N. E., and Raffa, K. F. 2010.** Geographic variation in bacterial communities associated with the red turpentine beetle (Coleoptera: Curculionidae). *Environmental Entomology* 39:406–414.  
doi: 10.1603/EN09221
- (2) **Bostock, R., Tisserat, N. A., Hasey, J., Cranshaw, W., and Seybold, S. J. 2010.** Update on thousand cankers disease. Western Pest Diagnostic Network Newsletter, February 2010, Volume 3, Number 1, 1 pp.,  
<https://www.wpdn.org/common/newsletters/wpdn/WPDN%20Newsletter%202010-02.pdf>.
- (3) **Burnside, R., Fettig, C. J., Hayes, C. J., Kruse, J. J., and Schultz, M. E. 2010.** Bark beetle technical working group studies on the northern spruce engraver. *AKES Newsletter* 3:3.
- (4) **Burnside, R., Fettig, C. J., Hayes, C. J., Schultz, M. E., and Kruse, J. J. 2010.** Northern spruce engraver beetle management in a changing climate – R&D slash management projects in Interior Alaska, pp. 11–13, *in* M. Lamb and L. Winton (eds.). Forest Health Conditions in Alaska-2009-A Forest Health Protection Report. USDA Forest Service, Alaska Region, R10-PR-21, Anchorage, Alaska, April, 2010, 73 pp.
- (5) **Dodds, K. J., Gilmore, D. W., and Seybold, S. J. 2010.** Assessing the threat posed by indigenous exotics: A case study of two North American bark beetle species. *Annals of the Entomological Society of America* 103:39–49.  
doi: 10.1603/008.103.0106
- (6) **Egan, J. M., Jacobi, W. R., Negrón, J. F., Smith, S. L., and Cluck, D. R. 2010.** Forest thinning and subsequent bark beetle-caused mortality in northeastern California. *Forest Ecology and Management* 260:1832–1842.  
doi:10.1016/j.foreco.2010.08.030
- (7) **Fettig, C. J. 2010.** Research in Review – Ecological consequences of alternative fuel reduction treatments in seasonally dry forests: The national fire and fire surrogate study. *Journal of Forestry* 108:7.
- (8) **Fettig, C. J., Borys, R. R., and Dabney, C. P. 2010.** Effects of fire and fire surrogate treatments on bark beetle-caused tree mortality in the Southern Cascades, California. *Forest Science* 56:60–73.

- (9) **Fettig, C. J. and McKelvey, S. R. 2010.** Bark beetle responses to stand structure and prescribed fire at Blacks Mountain Experimental Forest, California, USA: 5-year data. *Fire Ecology* 6:26–42.  
doi: 10.4996/fireecology.0602026
- (10) **Fettig, C. J., McKelvey, S. R., Cluck, D. L., Smith, S. L., and Otrrosina, W. J. 2010.** Effects of prescribed fire and season of burn on direct and indirect levels of tree mortality in ponderosa and Jeffrey pine forests in California, USA. *Forest Ecology and Management* 260:207–218.  
doi:10.1016/j.foreco.2010.04.019
- (11) **Fettig, C. J., Munson, A. S., Jorgensen, C. L., and Grosman, D. M. 2010.** Efficacy of fipronil for protecting individual pines from mortality attributed to attack by western pine beetle and mountain pine beetle (Coleoptera: Curculionidae, Scolytinae). *Journal of Entomological Science* 45:296–301.
- (12) **Flint, M. L., Graves, A. D., and Seybold, S. J. 2010.** Thousand cankers disease of walnuts spreads in California. *CAPCA Advisor Magazine*, June 2010, 8(3):36–39.
- (13) **Fowler, J. F., Hull Sieg, C., McMillin, J., Allen, K. K., Negrón, J. F., Wadleigh, L. L., Anhold, J. A. and K.E. Gibson, K. E. 2010.** Development of post-fire crown damage mortality thresholds in ponderosa pine. *International Journal of Wildland Fire* 19:583–588.  
<http://www.publish.csiro.au/journals/ijwfw>
- (14) **Graves, A. D., Flint, M. L., Coleman, T. W., and Seybold, S. J. 2010.** Thousand cankers disease of walnuts: A new disease in California, UC-IPM Website Publication, 4 pp., <http://www.ipm.ucdavis.edu/EXOTIC/thousandcankers.html>
- (15) **Grosman, D. M., Fettig, C. J., Jorgensen, C. L., and Munson, A. S. 2010.** Effectiveness of two systemic insecticides for protecting western conifers from mortality due to bark beetle attack. *Western Journal of Applied Forestry* 25:181–185.
- (16) **Hasey, J. K. and Seybold, S. J. 2010.** What's happening with thousand cankers disease of walnut in California. *Diamond Grower News*, Summer 2010, 5–6.
- (17) **Hofstetter, R. W., Hayes, C. J., McMillin, J., Fettig, C. J., and Ayres, M. P. 2010.** Relating bark beetle trap catch with beetle populations within trees and across stands, pp. 367–368, in J. A. Parrotta and M. A. Carr (eds.). *Forests for the Future: Sustaining Society and the Environment*. XXIII IUFRO World Congress; August 23–28, 2010, Seoul, Republic of Korea. *The International Forestry Review* 12(5):357, 508 pp. Commonwealth Forestry Association, [www.cfa-international.org](http://www.cfa-international.org). (Abstract).
- (18) **Kegley, S., Gibson, K. E., Gillette, N., Webster, J., Pederson, L., and Mori, S. 2010.** Individual-tree tests of verbenone flakes, verbenone pouches, and green-leaf volatiles to protect lodgepole pines from mountain pine beetle attack. *USDA Forest*

Service, Forest Health Protection Numbered Report 10-02, Coeur d'Alene Field Office, Coeur d'Alene, ID, 12 pp.

(19) **Klopfenstein, N. B., Juzwik, J., Ostry, M. E., Kim, M. -S., Zambino, P. J., Venette, R. C., Richardson, B. A., Lundquist, J. E., Lodge, D. J., Glaeser, J. A., Frankel, S. J., Otrosina, W. J., Spaine, P., and Geils, B. W. 2010.** Invasive forest pathogens: Summary of issues, critical needs, and future goals for Forest Service Research and Development, pp. 23–33, M. E. Dix and K. Britton (eds.). A Dynamic Invasive Species Research Vision: Opportunities and Priorities 2009-29. USDA Forest Service Gen. Tech. Report WO-79, Washington, D.C., May 2010, 130 pp.

(20) **Lee, J. C. and Seybold, S. J. 2010.** Host acceptance and larval competition in the banded and European elm bark beetles (Coleoptera: Scolytidae): Potential mechanisms for competitive displacement between invasive species. *Journal of Insect Behavior* 23:19–34.

[doi: 10.1007/s10905-009-9192-1](https://doi.org/10.1007/s10905-009-9192-1)

(21) **Leslie, C. A., Seybold, S. J., Graves, A. D., Cranshaw, W., and Tisserat, N. A. 2010.** Potential impacts of thousand cankers disease on commercial walnut production and walnut germplasm conservation, pp. 431–434, in D.L. McNeil (ed.). 6<sup>th</sup> International Walnut Symposium, 25-27 February 2009, Melbourne, Australia, *Acta Hort.* 861:431–434.

(22) **Luo, X., Gleisner, R., Tian, S., Negrón, J. F., Zhu, W., Horn, E., Pan, X. –J., and Zhu, J. –Y. 2010.** Evaluation of mountain beetle-infested lodgepole pine for cellulosic ethanol production by sulfite pretreatment to overcome recalcitrance of lignocelluloses. *Industrial and Engineering Chemistry Research* 49:8258–8266.  
doi: 10.1021/ie1003202

(23) **McIver, J. D. and Fettig, C. J. 2010.** Ecological consequences of alternative fuel reduction treatments in seasonally dry forests: The national fire and fire surrogate study. *Forest Science* 56:2–3.

(24) **Min, L., Wingfield, M. J., Gillette, N. E., Mori, S. R. and Sun, J. H. 2010.** Complex interactions among host pines and fungi vectored by an invasive bark beetle. *The New Phytologist* 187:859–866.  
doi: 10.1111/j.1469-8137.2010.03316.x

(25) **Owen, D. R., Smith, S. L., and Seybold, S. J. 2010.** The red turpentine beetle. USDA Forest Service, Forest Insect & Disease Leaflet No. 58, June 2010, 9 pp.

(26) **Progar, R. A., Sturdevant, N., and Rinella, M. J. 2010.** Trapping Douglas-fir beetle (*Dendroctonus pseudotsugae*) with pheromone-baited multiple-funnel traps does not reduce Douglas-fir, (*Pseudotsuga menziesii*) mortality. *Pan-Pacific Entomologist* 86(4):xxx–xxx.

(27) **Ruiz, E. R., Rinehart, J., Hayes, J. L., and Zúñiga, G. 2010.** Historical demography and phylogeography of a specialist bark beetle, *Dendroctonus pseudotsugae* Hopkins (Curculionidae: Scolytinae). *Environmental Entomology* 39:1685–1697. DOI: 10.1603/EN09339

(28) **Ruiz, E. R., Victor, J., Hayes J. L., and Zúñiga, G. 2010.** Molecular and morphological analysis of *Dendroctonus pseudotsugae* (Coleoptera: Curculionidae: Scolytinae): A reassessment of the taxonomic status of subspecies. *Annals of the Entomological Society of America* 102:982–997.  
doi: [10.1603/008.102.0608](https://doi.org/10.1603/008.102.0608)

(29) **Salinas-Moreno, Y., Ager, A., Vargas, F., Hayes, J. L., and Zuñiga, G. 2010.** Determining the vulnerability of Mexican pine forests to bark beetles of the genus *Dendroctonus* Erichson (Coleoptera: Curculionidae: Scolytinae). *Forest Ecology and Management* 260:52–61.  
doi: 10.1016/j.foreco.2010.03.029

(30) **Salinas-Moreno, Y., Vargas, F., Zuñiga, G., Victor, J., Ager, A., and Hayes, J. L. 2010.** ATLAS de Distribución DE los descortezadores del género *Dendroctonus* (Curculionidae: Scolytinae) Y Zonas HISTÓRICAS DE MAYOR PRESIÓN en LOS BOSQUES DE PINO de México (in Spanish).

(31) **Seybold, S. J., Graves, A. D., and Coleman, T. W. 2010.** Walnut twig beetle: Update on the biology and chemical ecology of a vector of an invasive fatal disease of walnut in the western U.S., pp. 55–57, in K. A. McManus and K. W. Gottschalk (eds.). Proceedings, 21<sup>st</sup> U.S. Department of Agriculture Interagency Research Forum on Gypsy Moth and Other Invasive Species 2010, January 12-15, 2010; USDA Forest Service Gen. Tech. Rep. NRS-P-75, Newtown Square, Pennsylvania, December 2010, 156 pp.

(32) **Seybold, S. J., Grulke, N. E., Graves, A. D., and Coleman, T. W. 2010.** Drought and forest insects: Interacting stressors on forest ecosystem health, p. 357, in J. A. Parrotta and M. A. Carr (eds.). Forests for the Future: Sustaining Society and the Environment. XXIII IUFRO World Congress; August 23-28, 2010, Seoul, Republic of Korea. *The International Forestry Review* 12(5):357, 508 pp. Commonwealth Forestry Association, [www.cfa-international.org](http://www.cfa-international.org). (Abstract).

(33) **Seybold, S. J., Haugen, D., O'Brien, J., and Graves, A. D. 2010.** Thousand cankers disease. USDA Forest Service, Northeastern Area State and Private Forestry Pest Alert, NA-PR-02-10, May, 2010, reprinted Aug. 2010, 2 pp.  
[http://na.fs.fed.us/pubs/palerts/cankers\\_disease/thousand\\_cankers\\_disease\\_low\\_res.pdf](http://na.fs.fed.us/pubs/palerts/cankers_disease/thousand_cankers_disease_low_res.pdf)

(34) **Seybold, S. J., Liu, D. -G., Venette, R. C., Flint, M. L., Munson, A. S., Bulaon, B. M., and Jorgensen, C. L. 2010.** Detection of low density invasive populations of the Mediterranean pine engraver, *Orthotomicus erosus*, in California with pheromone-baited traps, p. 368, in J. A. Parrotta and M. A. Carr (eds.). Forests for the Future: Sustaining Society and the Environment. XXIII IUFRO World Congress; August 23-28, 2010,

Seoul, Republic of Korea. *The International Forestry Review* 12(5):368, 508 pp.  
Commonwealth Forestry Association, www.cfa-international.org. (Abstract).

(35) **Walter, A. J., Venette, R. C., Kells, S. A., and Seybold, S. J. 2010.** Boring in response to bark and phloem extracts from North American trees does not explain host acceptance by the Mediterranean pine engraver, *Orthotomicus erosus* (Coleoptera: Scolytidae). *Environmental Entomology* 39:661–669.  
doi: 10.1603/EN09320

(36) **Walter, A. J., Venette, R. C., Kells, S. A., and Seybold, S. J. 2010.** Walking response of the Mediterranean pine engraver, *Orthotomicus erosus*, to novel plant odors host in a laboratory olfactometer. *Journal of Insect Behavior* 23:251–267.  
doi: 10.1007/s10905-010-9211-2

### **Editorial Activity**

*Agricultural and Forest Entomology* (J. L. Hayes)

*Forest Ecology and Management* (C. J. Fettig)

*Forest Science* (C. J. Fettig)

*Journal of Biofertilizers and Biopesticides* (C. J. Fettig)

*Journal of Chemical Ecology* (S. J. Seybold)

*Journal of Insect Science* (S. J. Seybold)

### **Technical Conferences and Workshops Organized**

(1) **Fettig, C. J., Coyle, D. R., and Nowak, J. T. Co-organizers and Moderators:** “Forest Entomology – Current Issues and Emerging Trends in North America” at the 58<sup>th</sup> Annual Meeting of the Entomological Society of America, December 14, 2010, San Diego, California.

(2) **Lundquist, J. E and Smith, E. Co-organizers and Moderators:** Monitoring the Effects of Climate Change on Forests. Focus Group Session, Annual Forest Health Monitoring Meeting, January 27, 2010, Albuquerque, New Mexico.

(3) **Seybold, S. J. Organizer and Moderator:** Fifty Years of Forest Entomology at UC-Berkeley: A Symposium Honoring the Lifetime Achievements of David L. Wood, P-IE Section Symposium, 58<sup>th</sup> Annual Meeting of the Entomological Society of America, December 12, 2010, San Diego, California.

(4) **Shaw, D. and Progar, R. A. Co-organizers and Moderators:** D5 Working Group, Technical Sessions: Bark Beetles in the U.S., and Invasive Species. 2010 Annual Convention of the Society of American Foresters, October 27-31, 2010, Albuquerque, New Mexico.

(5) **Zhang, Z. and Seybold, S.J. Co-organizers and Moderators:** G-09 Advances in Forest Pest Surveillance and Monitoring, Technical Session at the XXIII IUFRO World Congress, August 25, 2010, Seoul, Republic of Korea.

### **Contributed and Invited Presentations and Posters at Scientific Meetings and Workshops**

(1) **Beh, M. M., Seybold, S. J., and Rizzo, D. M.** Are burned, sudden oak death-infested forests more attractive to wood-boring beetles?: A comparison of beetle landing rates on tan oak trees in the Big Sur region. 58<sup>th</sup> Annual Meeting of the Entomological Society of America, December 15, 2010, San Diego, California (poster presentation by Beh).

(2) **Bentz, B. J.** Bark beetles in the Intermountain West: Who, where and why. Bark beetle impacts in the Intermountain West – Redefining post-disturbance forests and management strategies: A workshop to evaluate science status, management approaches, and policy implications, October 4, 2010, Laramie, Wyoming (invited oral plenary presentation).

(3) **Bentz, B. J.** Climate change and bark beetles: A focus on the southwestern U.S., 16<sup>th</sup> Annual Forest Health Monitoring Workgroup Meeting, USDA Forest Service, Forest Health Monitoring Program, January 26–29, 2010, Albuquerque, New Mexico (invited oral presentation).

(4) **Bentz, B. J.** Native bark beetles in the western United States: Who, where, and why? Environment and Energy Committee, Council of State Governments – West, September 13, 2010, Sun Valley, Idaho (invited oral presentation).

(5) **Bentz, B. J.** The influence of increasing temperature on mountain pine beetle outbreaks and associated tree mortality in western North America. Emerging Infectious Diseases in Response to Climate Change Conference. New York Academy of Sciences, March 2, 2010, New York City, New York (invited oral presentation).

(6) **Bentz, B. J.** The mountain pine beetle in western North America: Biology and implications for high-elevation forests. High Five: The Future of High-Elevation Five-Needle Pines in North America, June 29, 2010, Missoula, Montana (invited oral presentation).

(7) **Bentz, B. J., Hansen, E. M., and Vandygriff, J.** Physiological processes and bark beetle outbreaks. All Scientists Meeting, USDA Forest Service, Rocky Mountain Research Station, April, 2010, Fort Collins, Colorado (offered oral presentation by Bentz).

(8) **Blodgett, J. and Lundquist, J. E.** Distribution, species, and ecology of *Armillaria* spp. in Wyoming. Annual meeting, Western International Forest Disease Work

Conference, October 4-7, 2010, Valemount, British Columbia (oral presentation by Blodgett).

(9) **Bracewell, R., Six, D., and Bentz, B. J.** The evolution of sexual size dimorphism in *Dendroctonus* bark beetles. 58<sup>th</sup> Annual Meeting of the Entomological Society of America, December 13, 2010, San Diego, California (oral presentation by Bracewell).

(10) **Briggs, J., Costello, S., Negrón, J. F., Stephens, S., West, D., and Agauyo, I.** Mountain pine beetle in ponderosa pine forests of the Front Range: Potential host transition and impacts of past management. Presentation to the Forest Health Discussion Group, Colorado State University, February 2010, Fort Collins, Colorado, and the Northern Front Range Mountain Pine Beetle Working Group (April 2010) (oral presentations by Negrón).

(11) **Burbano, E., Wright, M. G., and Gillette, N. E.** Control tactics for the black twig borer, *Xylosandrus compactus* (Coleoptera: Curculionidae: Scolytinae), a pest of coffee in Hawaii. 58<sup>th</sup> Annual Meeting of the Entomological Society of America, December 12, 2010, San Diego, California (poster presentation by Burbano).

(12) **Burnside, R. E., Fettig, C. J., Hayes, C. J., Kruse, J. J., and Schultz, M. E.** Factors influencing northern spruce engraver, *Ips perturbatus*, colonization of slash and residual trees following land use changes in Alaska. 61<sup>st</sup> Annual Western Forest Insect Work Conference, April 2010, Flagstaff, Arizona (poster presentation by Burnside).

(13) **Egan, J. M., Jacobi, W. J., Negrón, J. F., Smith, S. L., and Cluck, D. R. 2010.** *Scolytus ventralis*-caused *Abies concolor* mortality in thinned and non-thinned stands, Warner Mountains, Northeastern California. 61<sup>st</sup> Annual Western Forest Insect Work Conference, April 8, 2010, Flagstaff, Arizona (oral presentation by Egan).

(14) **Fettig, C. J.** Effects of fire and fire surrogate treatments on bark beetle-caused tree mortality in the Southern Cascades, California. Pre- and Post-Wildfire Forest Management for Ecological Restoration and Fire Resiliency Conference, February 2010, Sacramento, California (poster presentation).

(15) **Fettig, C. J.** Scientific collaboration among Forest Service Research Stations and within national R&D. Pacific Southwest Research Station Station-wide Meeting, August 2010, Sacramento, California (oral presentation).

(16) **Fettig, C. J.** The effectiveness of thinning for preventing bark beetle infestations in western North America. 61<sup>st</sup> Annual Meeting of the Western Forest Insect Work Conference, April 8, 2010, Flagstaff, Arizona (oral presentation by Hayes).

(17) **Fettig, C. J. and McKelvey, S. R.** Bark beetle responses to stand structure and prescribed fire at Blacks Mountain Experimental Forest, California. 59<sup>th</sup> Annual Meeting of the California Forest Pest Council, November 16, 2010, McClellan, California (poster presentation by McKelvey).

- (18) **Fettig, C. J., Bulaon, B., McKelvey, S. R., Hayes, C. J., and Dabney, C. P.** Small-scale stand protection from mountain pine beetle: An “Operational” Research and Demonstration Project at June Mountain, California. 59<sup>th</sup> Annual Meeting of the California Forest Pest Council, November 16, 2010, McClellan, California (poster presentation by Dabney).
- (19) **Fettig, C. J., DeGomez, T., McMillin, J. D., Anhold, J. A., Hayes, C. J., and McKelvey, S. R.** Managing slash in pine dominated stands to minimize colonization of residual trees by *Ips* and other bark beetle species. 5<sup>th</sup> Biennial Lake Tahoe Basin Science Conference, March 2010, Incline Village, Nevada (oral presentation by Hayes).
- (20) **Fettig, C. J., McKelvey, S. R., and Hayes, C. J.** Bark beetle responses to fuels reduction and forest restoration treatments two and four years after the application of prescribed fire in a mixed-conifer forest. 61<sup>st</sup> Annual Western Forest Insect Work Conference, April 8, 2010, Flagstaff, Arizona (oral presentation by Hayes).
- (21) **Fettig, C. J., McKelvey, S. R., Cluck, D. R., Smith, S. L., and Otrrosina, W. J.** Effects of prescribed fire and season of burn on direct and indirect levels of tree mortality in eastside pine forests of the Sierra Nevada. 5<sup>th</sup> Biennial Lake Tahoe Basin Science Conference, March 2010, Incline Village, Nevada (poster presentation by McKelvey).
- (22) **Fettig, C. J., McMillin, J. D., Anhold, J. A., Hamud, S. M., Borys, R. R., Dabney, C. P., and Seybold, S. J.** The effects of mechanical fuel reduction treatments on the activity of bark beetles infesting ponderosa pine. National Indian Forestry & Wildland Fire Management Conference, March 2010, Phoenix, Arizona (poster presentation by McMillin).
- (23) **Fettig, C. J., Munson, A. S., Grosman, D. M., Bush, P., Hayes, C. J., and McKelvey, S. R.** Emamectin benzoate and propiconazole for protection of lodgepole pine from mountain pine beetle: An update. 61<sup>st</sup> Annual Western Forest Insect Work Conference, Flagstaff, AZ, April 8, 2010 (poster by Hayes) and 53<sup>rd</sup> Annual Southern Forest Insect Work Conference, July 2010, Wilmington, North Carolina (poster presentations by Grosman).
- (24) **Fettig, C. J., Munson, A. S., Hayes, C. J., Grosman, D. M., and Bush, P. B.** Effectiveness of emamectin benzoate and propiconazole for protecting lodgepole pine from mortality due to mountain pine beetle attack. 59<sup>th</sup> Annual Meeting of the California Forest Pest Council, November 16–17, 2010, McClellan, California (poster presentation by Hayes).
- (25) **Flint, M. L. and Seybold, S. J.** The impact of walnut twig beetle and thousand cankers disease on walnut rootstock: Significance to commercial walnut production in California. 42<sup>nd</sup> Annual Walnut Research Conference, UC Davis Bodega Marine Laboratory, January 22, 2010, Bodega Bay, California (oral presentation by Seybold).

(26) **Gillette, N. E.** Silvicultural and pheromone-based methods for bark beetle control. Fifty Years of Forest Entomology at UC-Berkeley: A Symposium Honoring the Lifetime Achievements of David L. Wood, P-IE Section Symposium, 58<sup>th</sup> Annual Meeting of the Entomological Society of America, December 12, 2010, San Diego, California (invited oral presentation).

(27) **Gillette, N. E.** The Boomerang Project: Fungi associated with the red turpentine beetle in China. Annual meeting, Western International Forest Disease Work Conference, October 4-7, 2010, Valemount, British Columbia (invited oral presentation by Gillette).

(28) **Gillette, N. E., Lu, M., Sun, J. -H., Wingfield, M. J., and Owen, D. R.** The Boomerang Project: An invasive bark beetle and its fungal hitchhikers. 59<sup>th</sup> Annual Meeting of the California Forest Pest Council, November 16–17, 2010, McClellan, California (invited oral presentation by Gillette).

(29) **Gillette, N. E., Lu, M., Sun, J. H., Wingfield, M. J., Owen, D. R., and Erbilgin, N.** The Boomerang Project: *Dendroctonus valens* and its Ophiostomatoid Hitch-Hikers. Western Forest Insect Work Conference, Flagstaff, Arizona, April 8, 2010 (oral presentation by Gillette).

(30) **Gillette, N. E., Mori, S. R., Murray, W. J., Kelly, N. M, Wood, D. L., and Webster, J. N.** Brood tree removal and verbenone treatments mitigate mountain pine beetle risk. 61<sup>st</sup> Annual Western Forest Insect Work Conference, April 8, 2010, Flagstaff, Arizona (poster presentation by Gillette).

(31) **Gillette, N. E., Mori, S. R., Murray, W. J., Kelly, N. M, Wood, D. L., and Webster, J. N.** Verbenone in integrated pest management of bark beetles. Community symposium organized by For the Forest, December 17, 2009, Aspen, Colorado (invited oral presentation by Gillette).

(32) **Gillette, N. E., Uzoh, F., Mori, S., and Uzoh, E.** Potential semiochemicals for western pine beetle. 61<sup>st</sup> Annual Western Forest Insect Work Conference, April 8, 2010, Flagstaff, Arizona (poster presentation by Gillette).

(33) **Graves, A. D., Seybold, S. J., and Coleman, T. W.** Walnut twig beetle and thousand cankers disease. Southern Forest Insect Work Conference, July 2010, Wilmington, North Carolina (oral presentation by Coleman).

(34) **Grosman, D. M., Upton, W. W., Fettig, C. J., and Clarke, S.** Update on tree injection trials for protection against southern pine beetle, mountain pine beetle, and bluestain fungi. East Texas Forest Entomology Seminar, S.F. Austin University, Kurth Lake Lodge, October 2010, Texas (oral presentation by Grosman).

(35) **Hansen, E. M., Amacher, M. C. Van Miegroet, H., White, M. A., Long, J. N., and Ryan, M. G.** The influence of mountain pine beetle outbreaks on carbon and nitrogen dynamics in lodgepole pine ecosystems: Preliminary results of an ongoing study.

61<sup>st</sup> Annual Western Forest Insect Work Conference, April 5-8, 2010, Flagstaff, Arizona (poster presentation by Hansen).

(36) **Hayes, J. L., Mendoza, M. G., Zuñiga, G., and Fettig, C. J.** Changing forest conditions, bark beetles, and *Dendroctonus rhizophagus* - a novel pine bark beetle in the Mexico-USA transborder region. 58<sup>th</sup> Annual Meeting of the Entomological Society of America, December 2010, San Diego, California (oral presentation by Fettig).

(37) **Hicke, J., Preisler, H., and Hayes, J. L.** Estimating climate influences on mountain pine beetle outbreaks in Washington and Oregon using statistical modeling. MtnClim Symposium, H.J. Andrews Experimental Forest, 2010, Oregon (poster presentation by Hicke).

(38) **Hicke, J., Johnson, M., Hayes, J. L., and Preisler, H.** Effects of beetle-killed trees on subsequent wildfire. Association of Pacific Coast Geographers, September 2010, Spokane, Washington (oral presentation by Hicke).

(39) **Hishinuma, S. M., Flint, M. L., Bostock, R. M., and Seybold, S. J.** Interactions of the walnut twig beetle, *Pityophthorus juglandis*, and the pathogenic fungus, *Geosmithia morbida*, in thousand cankers disease of walnuts in California. 59<sup>th</sup> Annual Meeting of the California Forest Pest Council, November 16–17, 2010, McClellan, California (poster presentation by Hishinuma).

(40) **Hofstetter, R. H., Hayes, C. J., McMillin, J. D., Fettig, C. J., and Ayres, M.P.** Relating bark beetle trap catch with beetle populations within trees and across stands. XXIII IUFRO (International Union of Forest Research Organizations) World Congress, August 25, 2010, Seoul, Republic of Korea (oral presentation by Hofstetter).

(41) **Kegley, S., Gibson, K., Gillette, N. E., Webster, J., Pederson, L., and Mori, S.** Individual-tree tests of verbenone flakes, verbenone pouches, and green-leaf volatiles to protect lodgepole pines from mountain pine beetle attack. 61<sup>st</sup> Annual Western Forest Insect Work Conference, April 8, 2010, Flagstaff, Arizona (poster presentation by Kegley).

(42) **Lerch, A., Bentz, B. J., Blackford, D., and Raffa, K. F.** Response of mountain pine beetle populations to fire-injured lodgepole and ponderosa pines: Implications for disturbance interactions and bark beetle outbreaks. 58<sup>th</sup> Annual Meeting of the Entomological Society of America, December 13, 2010, San Diego, California (oral presentation by Lerch).

(43) **Liu, D. –G., Coleman, T. W., Bohne, M., Flint, M. L., and Seybold, S. J.** The impact of wildfire on invasive bark and woodboring beetles in periurban forests of Southern California (Project #: WC-F-08-01). 16<sup>th</sup> Annual Forest Health Monitoring Workgroup Meeting, USDA Forest Service, Forest Health Monitoring Program, January 26–29, 2010, Albuquerque, New Mexico (poster presentation by A. D. Graves).

- (44) **Lundquist, J. E.** Climate change and forest insects. 16<sup>th</sup> Annual Forest Health Monitoring Workgroup Meeting, USDA Forest Service, Forest Health Monitoring Program, January 27, 2010, Albuquerque, New Mexico (oral presentation).
- (45) **Lundquist, J. E.** Forest insects on the Kenai. University of Alaska, Fairbanks Field Course, May 2010, Cooper Landing, Alaska (oral presentation).
- (46) **Lundquist, J. E.** Insects, climate, and the Kenai. Climate Change Forum, Chugach NF Leadership Team Meeting, February 3, 2010, Girdwood, Alaska (oral presentation).
- (47) **Lundquist, J. E.** Insect pests in our forests – What will a changing climate do to them? Alaska Forum on the Environment, February 8-12, 2010, Anchorage, Alaska (poster presentation).
- (48) **Lundquist, J. E. and Reich, R. M.** Integrating aerial survey methods with spatial modeling to improve predictions of insect pest distributions in remote areas of Alaska. 2010 Annual Convention of the Society of American Foresters, October 27-31, 2010, Albuquerque, New Mexico (poster presentation by Lundquist).
- (49) **Nelson, L. J., Graves, A. D., Gries, R., and Seybold, S. J.** Identification of semiochemicals for detection and monitoring of the walnut twig beetle, *Pityophthorus juglandis* (Coleoptera: Scolytidae). 58<sup>th</sup> Annual Meeting of the Entomological Society of America, December 15, 2010, San Diego, California, (poster presentation by Nelson).
- (50) **Progar, R. A.** Efforts to reduce mountain pine beetle attack in lodgepole pine using verbenone. Forest Health in Oregon: State of the State, February 24-25, 2010, LaSells Stewart Center, Oregon State University, Corvallis, Oregon (oral presentation by Progar).
- (51) **Progar, R. A., Blackford, D., Cluck, D., Costello, S., Eager, T., Jorgensen, C., Mocettini, P., Munson, A. S., and Steed, B.** Efforts to reduce mountain pine beetle attack in lodgepole pine using verbenone. 61<sup>st</sup> Annual Western Forest Insect Work Conference, April 8, 2010, Flagstaff, Arizona and 2010 Annual Convention of the Society of American Foresters, October 27-31, 2010, Albuquerque, New Mexico (poster presentations by Progar).
- (52) **Progar, R. A., Scott, D., Schmitt, C., Speigel, L., Hostetler, B., Wilhite, B., Eglitis, A., Chadwick, K., Mehmel, C., Goheen, D., Acker, S., Ganio, L., and Hart, S.** Assessing post-fire tree survival in Oregon and Washington. 2010. 61<sup>st</sup> Annual Western Forest Insect Work Conference, April 8, 2010, Flagstaff, Arizona and 2010 Annual Convention of the Society of American Foresters, October 27-31, 2010, Albuquerque, New Mexico (poster presentations by Progar).
- (53) **Sánchez Martínez, G., Mehmel, C. J., Allen-Reid, D., Gillette, N. E., and Mori, S. R.** Evaluation of the antiaggregation pheromone MCH, for controlling the Douglas-fir beetle, *Dendroctonus pseudotsugae*, in Mexico: Preliminary results. 61<sup>st</sup> Annual Western

Forest Insect Work Conference, April 5-9, 2010, Flagstaff, Arizona (oral presentation drafted by Sanchez Martínez and presented by Allen-Reid).

(54) **Seybold, S. J.** An update on the monitoring and detection of the walnut twig beetle. Annual National Plant Board Meeting, July 27, 2010, Indianapolis, Indiana (invited oral presentation).

(55) **Seybold, S. J.** Biology and detection of the walnut twig beetle: The vector of thousand cankers disease. 85<sup>th</sup> Annual Central Plant Board Meeting, March 9, 2010, Minneapolis, Minnesota (invited oral presentation).

(56) **Seybold, S. J.** Invasive forest insects in the western United States: An update on status and trends. Presentation in the D5 Working Group Technical Session, Forest Entomology and Pathology, Forest Health and Fire Track, Invasive Forest Insects and Disease in North America, R. Progar and D. Shaw, Organizers. The Society of American Foresters National Convention, October 29, 2010, Albuquerque, New Mexico (invited oral presentation).

(57) **Seybold, S. J.** Thousand cankers disease in walnuts. Solano/Yolo Walnut Meeting, February 23, 2010, Woodland, California (invited oral presentation).

(58) **Seybold, S. J.** Walnut twig beetle and thousand cankers disease: Characterizing an emergent threat to forest and agroecosystems in North America. Departmental seminar presentation to the Department of Entomology, University of California, May 19, 2010, Davis, Davis, California (invited oral presentation).

(59) **Seybold, S. J.** Walnut twig beetle and thousand cankers disease: Status of the problem in California and the U.S.” Northern California Entomological Society, Nov. 5, 2010, Concord, California, and 59<sup>th</sup> Annual Meeting of the California Forest Pest Council, Nov. 17, 2010, McClellan, California (invited oral presentations).

(60) **Seybold, S. J., Graves, A. D., and Coleman, T. W.** Walnut twig beetle: Update on the biology and chemical ecology of a vector of an invasive and fatal disease of walnut in the western U.S. 21<sup>st</sup> U.S. Department of Agriculture Interagency Research Forum on Invasive Species, Sponsored by the USDA Forest Service Research, the Agricultural Research Service, USDA APHIS and the USDA NIFA, January 14, 2010, Annapolis, Maryland (invited oral presentation by Seybold).

(61) **Seybold, S. J., Grulke, N. E., Graves, A. D., and Coleman, T. W. 2010.** Drought and forest insects: Interacting stressors on forest ecosystem health, XXIII IUFRO World Congress, August 27, 2010, Seoul, Republic of Korea (invited oral presentation by Seybold).

(62) **Seybold, S. J., Liu, D. -G., Venette, R. C., Flint, M. L., Munson, A. S., Bulaon, B. M., and Jorgensen, C. L. 2010.** Detection of low density invasive populations of the Mediterranean pine engraver, *Orthotomicus erosus*, in California with pheromone-baited

traps, XXIII IUFRO World Congress, August 25, 2010, Seoul, Republic of Korea (oral presentation by Seybold, also organized this session).

(63) **Tisserat, N. A., Cranshaw, W., Graves, A. D., and Seybold, S. J.** Distribution of thousand cankers disease and the walnut twig beetle, associated with *Juglans* spp. mortality in the western U.S. (Project # INT-DM-09-01). 16<sup>th</sup> Annual Forest Health Monitoring Workgroup Meeting, USDA Forest Service, Forest Health Monitoring Program, January 26–29, 2010, Albuquerque, New Mexico (poster presentation by A.D. Graves).

(64) **West, D. R., Negrón, J. F., Costello, S. L., and Jacobi W. R.** Mountain pine beetle-caused lodgepole mortality from the 1980's and subsequent fire occurrence in Colorado. 61st Annual Western Forest Insect Work Conference, April 5-9, 2010, Flagstaff, Arizona (poster presentation by West).

### **Briefings and Testimony**

(1) **Fettig, C. J.** Prepared testimony on behalf of the Agency in response to the Draft Guidance for Pesticide Registrants on Pesticide Drift Labeling issued by the U.S. Environmental Protection Agency.

### **Media Recognition**

(1) **Bentz, B. J.** A researcher says the bark beetle outbreak is misunderstood, October 8, 2010, Wyoming Public Radio.

(2) **Fettig, C. J.** Bark beetle outbreaks will spread as forests adapt to climate change, September 2010. Article authored by Thomas Schueneman, <http://www.globalwarmingisreal.com>

(3) **Fettig, C. J.** Beetles and climate change – implications for the Southwest, September 2010, Interview with Paul Atkinson, National Public Radio, Phoenix, Arizona.

(4) **Fettig, C. J.** Pacific Northwest forests could face beetle damage: Report, September 2010. Article by *Pudget Sound Business Journal*, <http://www.bizjournals.com/seattle/stories/2010/09/06/daily19.html>

(5) **Fettig, C. J.** Study: Warmer climate will bring more tree-killing beetles, September 2010. Article authored by Cassandra Profita, <http://ecotrope.opb.org/2010/09/study-warmer-climate-will-bring-more-tree-killing-beetles/>

(6) **Gillette, N. E.** Round two of Smuggler beetle fight under way, June 2, 2010, Aspen Daily News article by Andrew Travers. <http://www.aspendailynews.com/section/home/140857>

(7) **Gillette, N. E.** Study finds Smuggler beetle battle effective, March 15, 2010, Aspen Daily News article by David Frey.  
<http://www.aspendailynews.com/section/home/139690>

(8) **Seybold, S. J.** An unknown threat: Beetle, fungus conspire to kill black walnuts, concerning experts about English walnut's fate, September 28, 2010, *The Grower* September-October 2010. Article authored by Vicky Boyd.  
<http://www.growermagazine.com/Archive/ArticleLanding/tabid/57/Default.aspx?tid=1&cid=838938&issueid=788>

(9) **Seybold, S. J.** Thousand cankers disease spreading; now in east Tennessee, August 9, 2010, UC-Davis Department of Entomology Online New Release. Article authored by Kathy Keatley Garvey.  
<http://entomology.ucdavis.edu/news/thousandcankersdiseasespreading.html>