

# Western Bark Beetle Research Group

## Accomplishments Report: Jan. 2011-Dec. 2011

### Group Products

#### Publications

- (1) **Burnside, R.E., Holsten, E.H., Fettig, C.J., Kruse, J.J., Schultz, M.E., Hayes, C.J., Graves, A.D., and Seybold, S.J. 2011.** The northern spruce engraver. USDA Forest Service, Forest Insect & Disease Leaflet No. 180, September 2011, 12 pp.
- (2) **Hansen, E.M., Bentz, B.J., Powell, J.A., Gray, D.R., and Vandygriff, J.C. 2011.** Prepupal diapauses and instar IV developmental rates of the spruce beetle, *Dendroctonus rufipennis* (Coleoptera: Curculionidae, Scolytinae). *Journal of Insect Physiology* 57:1347–1357.
- (3) **Lee, J.C., Negrón, J.F., McElwey, S.J., Williams, L., Witcosky, J.J., Popp, J.B., and Seybold, S.J. 2011.** Biology of the invasive banded elm bark beetle (Coleoptera: Scolytidae) in the western United States. *Annals of the Entomological Society of America* 104:705–717. doi:10.1603/AN 10150.
- (4) **Lundquist, J.E., Camp, A.E., Tyrell, M.L., Seybold, S.J., Cannon, P., and Lodge, D.J. 2011.** Earth, wind, and fire: Abiotic factors and the impacts of global environmental change on forest health, pp. 195–243, Ch. 7, in J.D. Castello and S.A. Teale (eds.). *Forest Health: An Integrated Perspective*. Cambridge University Press, Cambridge, UK, 392 pp.

#### Technical Conferences and Workshops Organized

- (1) **Fettig, C.J. and Progar, R.A. Co-organizers and moderators:** “Bark Beetles and Fire Interactions in Western Coniferous Forests: Effects” (plenary session) and “Bark Beetles and Fire Interactions in Western Coniferous Forests: Fuels and Fire Risk” (concurrent session) at the 5th North American Forest Insect Work Conference, Portland, Oregon, May 12, 2011.
- (2) **Gillette, N.E. and Dix, M.E. Co-organizers; Gillette moderator:** “Invasives, Climate Change, and Forest Management: the Forest Service Research Perspective.” Symposium highlighting USDA Forest Service R&D at the 59th Annual Meeting of the Entomological Society of America, Reno, Nevada, November 16, 2011.

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

- (1) **Fettig, C.J., Bentz, B.J., Gibson, K.E., Gillette, N.E., Jenkins, M.J., Jorgensen, C.L., McKelvey, S.R., Munson, A.S., Negrón, J.F., Progar, R.A., and Steed, B.E.** Mountain pine beetle outbreaks in western North America: Causes and consequences. 59th Annual Meeting of the Entomological Society of America, Reno, Nevada, November 16, 2011 (oral presentation by Fettig).
- (2) **Fettig, C.J., Bentz, B.J., Gillette, N.E., Hayes, J.L., Lundquist, J.E., Kelsey, R.G., 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. 5th North American Forest Insect Work Conference, Portland, Oregon, May 10, 2011 (poster presentation by Fettig).
- (3) **Fettig, C.J., Gillette, N.E., Mori, S., Carvalho, C., Dabney, C., and McKelvey, S.** Pheromones for individual-tree and area-wide bark beetle mitigation. USDA FS PSW Station Ecosystem Function and Health Program Meeting, Davis, California, October 25, 2011 (poster presentation by Gillette).
- (4) **Fettig, C.J., Hughes, R.F., Gillette, N.E., Millar, C.I., and Seybold, S.J.** The new “Invasives and Threats” team at the Pacific Southwest Research Station. 5th North American Forest Insect Work Conference, Portland, Oregon, May 10, 2011; Fire and Fuels Workshop, Redding, California, June 2011; and USDA FS PSW Station Ecosystem Function and Health Program Meeting, Davis, California, October 25, 2011 (poster presentations by Fettig).
- (5) **Fettig, C.J., McKelvey, S.R., Munson, A.S., Gibson, K.E., Jorgensen, C.L., Negrón, J.F., and Steed, B.** Quantifying the short- and long-term impacts of mountain pine beetle outbreaks on forest fuels and other stand attributes in the Intermountain West. Prepared for the Forest Health Monitoring Annual Meeting and displayed on their website, January 2011.  
<http://fhm.fs.fed.us/posters/posters11/INT-EM-F-10-03-Fettigetel-poster-1-25-2011.pdf>
- (6) **Fettig, C.J., McKelvey, S.R., Munson, A.S., Gibson, K.E., Jorgensen, C.L., Negrón, J.F., and Steed, B.** Quantifying impacts from mountain pine beetle outbreaks. 5th North American Forest Insect Work Conference, Portland, Oregon, May 10, 2011 (poster presentation by Fettig).
- (7) **Lynch A.M. and Bentz B.J.** Mountain pine beetle on *Pinus strobiformis* in the Pinaleno Mountains, southern Arizona, preliminary results. USDA Forest Service Bark Beetle Technical Working Group Meeting, San Diego, California, October 4-6, 2011 (oral presentation by Lynch).

## **Individual Member Products**

### **Publications**

- (1) **Bentz, B.J., Campbell, E., Gibson, K., Kegley, S., Logan, L., and Six, D. 2011.** Mountain pine beetle in high-elevation five-needle white pine ecosystems, pp. 78–84, in Keane et al. (eds.). *The Future of High-Elevation, Five-Needle White Pines in Western North America: Proceedings of the High Five Symposium*. June 28–30, 2010, Missoula, Montana. Proceedings RMRS-P-63.
- (2) **Bentz B.J., Bracewell, R.B., Mock, K.E., and Pfrender, M.E. 2011.** Genetic architecture and phenotypic plasticity of thermally-regulated traits in an eruptive species, *Dendroctonus ponderosae*. *Evolutionary Ecology* 25:1269–1288.
- (3) **Bracewell R.B., Pfrender, M.E., Mock, K.E., and Bentz, B.J. 2011.** Cryptic postzygotic isolation in an eruptive species of bark beetle (*Dendroctonus ponderosae*). *Evolution* 65:961–975. doi:10.1111/j.1558-5646.2010.01201.x
- (4) **Coleman, T.W., Grulke, N.E., Daly, M., Godinez, C., Schilling, S.L., Riggan, P.J., and Seybold, S.J. 2011.** Coast live oak, *Quercus agrifolia*, susceptibility and response to goldspotted oak borer, *Agrilus auroguttatus*, injury in southern California. *Forest Ecology and Management* 261:1852–1865. doi:10.1016/j.foreco.2011.02.008.
- (5) **Coleman, T.W., Lopez, V., Stouthamer, R., Rugman-Jones, P.F., Seybold, S.J., Reardon, R., and Hoddle, M.S. 2011.** Can the destruction of California’s oak woodlands be prevented? Potential for biological control of the goldspotted oak borer, *Agrilus auroguttatus*. *BioControl* doi: 10.1007/s10526-011-9404-4.
- (6) **Coleman, T.W. and Seybold, S.J. 2011.** Collection history and comparison of the interactions of the goldspotted oak borer, *Agrilus auroguttatus* Schaeffer (Coleoptera: Buprestidae), with host oaks in southern California and southeastern Arizona. *Coleopterists Bulletin* 65:93–108.
- (7) **Costello, S.L, Negrón, J.F., and Jacobi, W.R. 2011.** Wood-boring insect abundance in fire-injured ponderosa pine. *Agricultural and Forest Entomology* 13:373–381.
- (8) **Fettig, C.J. 2011.** Expert report of Christopher J. Fettig in the London Court of International Arbitration No. 111790, 28 pp.
- (9) **Fettig, C.J., Hayes, C.J., McKelvey, S.R., and Mori, S.L. 2011.** Laboratory assays of select candidate insecticides for control of *Dendroctonus ponderosae* Hopkins. *Pesticide Management Science* 67:548–555.

- (10) **Fettig, C.J., Burnside, R.E., Hayes, C.J., and Schultz, M.E. 2011.** Field evaluations of emamectin benzoate for control of birch leafminer (Hymenoptera: Tenthredinidae) in Interior Alaska. *Journal of Entomological Science* 46:339–341.
- (11) **Flint, M.L., Coleman, T.W., and Seybold, S.J. 2011.** Goldspotted oak borer threatens California oaks. *CAPCA Advisor Magazine*, Sept. 2011, 14(5):22–23.
- (12) **Gillette, N.E., Lu, M., Sun, J.-H., Owen, D.R., and Wingfield, M.J. 2011.** New fungal associates of the red turpentine beetle in China: A phytosanitary cautionary tale, pp. 49–54, in M. Fairweather and P. Palacios (compilers.). 2011. Invited Special Paper in the Proceedings of the 58th Annual Western International Forest Disease Work Conference; October 4–8, 2010; Valemount, British Columbia, USDA Forest Service, AZ Zone Forest Health Protection, Flagstaff, Arizona.
- (13) **Hishinuma, S., Coleman, T. W., Flint, M. L., and Seybold, S. J. 2011.** Goldspotted oak borer: Field identification guide, University of California Agriculture and Natural Resources, Statewide Integrated Pest Management Program, 6 pp., January 13, 2011, [http://www.ipm.ucdavis.edu/PDF/MISC/GSOB\\_field-identification-guide.pdf](http://www.ipm.ucdavis.edu/PDF/MISC/GSOB_field-identification-guide.pdf)
- (14) **Jacobi, W.J., Crump, A., and Lundquist, J.E. 2011.** Dissemination of forest health research information in the Rocky Mountains. *Journal of Forestry* Jan/Feb: 43–49.
- (15) **Kim, S., Harrington, T.C., Lee, J. C., and Seybold, S. J. 2011.** *Leptographium tereforme*, *sp. nov.* and other Ophiostomatales isolated from the redhaired pine bark beetle, *Hylurgus ligniperda*, in California. *Mycologia* 103:152–163. doi:10.3852/10-096.
- (16) **Klutsch, J.G., Battaglia, M.A., West, D.R., Costello, S.L., and Negrón, J.F. 2011.** Evaluating potential fire behavior in lodgepole pine-dominated forests after a mountain pine beetle epidemic in north-central Colorado. *Western Journal of Applied Forestry* 26:101–109.
- (17) **Lu, M., Wingfield, M.J., Gillette, N., and Sun, J.-H. 2011.** Do novel genotypes drive the success of an invasive bark beetle/fungus complex? Implications for potential reinvasion. *Ecology* 92:2013–2019.
- (18) **Lundquist, J.E. and Reich, R.M. 2011.** Predicting the landscape spatial distribution of fuel-generating insects, diseases, and other types of disturbances. *Journal of Sustainable Forestry* 30:370–391.
- (19) **Lundquist, J.E. and Schultz, M.E. 2011.** Insects of coastal forest Alaska. pp. 62–66, in T.M. Barrett and G.A. Christensen (tech. eds.). Forests of Southeast and South-central Alaska, 2004-2008. Five-year Forest Inventory and Analysis Report. Gen. Tech. Rep. PNW-GTR-835. Portland, Oregon: USDA Forest Service, Pacific Northwest Research Station.

(20) **Negrón, J.F., Schaupp, W.C. Jr., and Pederson, L. 2011.** Flight periodicity of the Douglas-fir beetle, *Dendroctonus pseudotsugae* Hopkins (Coleoptera: Curculionidae: Scolytinae) in Colorado, U.S.A. *Coleopterists Bulletin* 65:182–184.

(21) **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* 86:111–118. (This product was included in the Jan. 2010-Dec. 2010 WBBRG Accomplishments Report, but the full citation was not available when that report was prepared).

(22) **Seybold, S.J. 2011.** Invasive Woodboring Beetles. Western Pest Diagnostic Network Newsletter, June, 2011, Volume 4, Number 2, 1 pp., <https://www.wpdn.org/common/newsletters/wpdn/WPDN%20Newsletter%202010-02.pdf>.

(23) **Tisserat N., Cranshaw W., Putnam, M., Pscheidt, J. Leslie, C.A., Murray, M., Hoffman, J., Barkely, Y., Alexander, K., and Seybold, S.J. 2011.** Thousand cankers disease is widespread on black walnut, *Juglans nigra*, in the western United States. Online. *Plant Health Progr.* (published online only, June 30, 2011). doi:10.1094/PHP-2011-0630-01-BR.

(24) **Zerillo, M.M., Woeste, K., Freeland, E., Seybold, S.J., Cranshaw, W., and Tisserat, N. 2011.** Population structure of *Geosmithia morbida* in the United States is complex. *Phytopathology* 101:S201.

(25) **Zhu, J.-Y., Luo, X., Tian, S., Gleisner, R., Negrón, J, and Horn, E. 2011.** Efficient ethanol production from beetle-killed lodgepole pine using SPORL technology and *Saccharomyces cerevisiae* without detoxification. *Technical Association of the Pulp and Paper Industry Journal* 10:9–18.

### **Patents and Environmental Protection Agency Product Registrations**

(1) **Seybold, S. J., Dallara, P. L., Nelson, L. J., Graves, A. D., Hishinuma, S. M., and Gries, R. 2011.** Methods of monitoring and controlling the walnut twig beetle, *Pityophthorus juglandis*. Provisional Patent filed with the U.S. Patent and Trademark Office, U.S. Dept. of Commerce, July 15, 2011, U.S. Provisional Application No. 61/508.441, 22 pp.

## **Editorial Activity**

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

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

*Forest Science* (C.J. Fettig)

*International Scholarly Research Network Forestry* (J.F. Negrón)

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

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

*Journal of Forestry* (J.E. Lundquist)

## **Technical Conferences and Workshops Organized**

(1) **Bentz, B.J. and K. Raffa, K.F. Co-organizers and moderators:** Fourth Workshop on Genetics of Bark Beetles and Associated Microorganisms, 5<sup>th</sup> North American Forest Insect Work Conference, Portland, Oregon, May 10, 2011.

(2) **Fettig, C.J., Coyle, D.R., and Nowak, J.T. Co-organizers and moderators:** “Forest Entomology – 10 Years at ESA,” 59<sup>th</sup> Annual Meeting of the Entomological Society of America, Reno, Nevada, November 15, 2011.

(3) **Fettig, C.J., Munson, A.S., and Nowak, J.T. Co-organizers and moderators:** “Bark Beetles and Stand Structure Following Thinning in Coniferous Forests” at the 5<sup>th</sup> North American Forest Insect Work Conference, Portland, Oregon, May 11, 2011.

(4) **Gandhi, K.J.K., Bentz, B.J., and Raffa, K.F. Co-organizers and moderators:** Interactions between Ecosystem Disturbances and Forest Insects, 5<sup>th</sup> North American Forest Insect Work Conference, Portland, Oregon, May 11, 2011.

(5) **Progar, R. Organizer and moderator:** The D5 Working Group Technical Session, Forest Entomology and Pathology, Forest Health and Fire Track, Biosecurity: Partnerships between Research and Management to Mitigate the Impact of Invasive Species in the Western U.S., The Society of American Foresters National Convention, Honolulu, Hawaii, November 4, 2011.

(6) **Seybold, S.J. Organizer and moderator:** Walnut Twig Beetle and Thousand Cankers Disease: Framing the Response to our Valuable North American Walnut Resource. Workshop at the 5<sup>th</sup> North American Forest Insect Work Conference, Portland, Oregon, May 11, 2011.

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

- (1) **Beh, M., Kelsey, R.G., Shaw, D., and Manter, D.K.** Elevated ethanol concentrations in the canker region of *Phytophthora ramorum*-infected coast live oaks. California Forest Pest Council 60<sup>th</sup> Annual Meeting, McClellan, California, November 15-16, 2011 (poster presentation by Beh).
- (2) **Bentz, B.J.** Bark beetles in Utah forests: Who, what, where. Beetles, Water, and Climate: Utah Bark Beetle-Water Workshop; Western Water Assessment, Salt Lake City, Utah, December 1, 2011 (invited oral presentation).
- (3) **Bentz, B.J.** Bark beetles in Utah forests: Climate effects. Beetles, Water, and Climate: Utah Bark Beetle-Water Workshop; Western Water Assessment, Salt Lake City, Utah, December 1, 2011 (invited oral presentation).
- (4) **Bentz, B.J.** Climate influences on bark beetle population success. The Ohio State University. Department of Entomology, Wooster, Ohio, March 2011 (invited oral presentation).
- (5) **Bentz, B.J.** Predicting climate effects on bark beetle population success. Ecological Society of America Annual Meeting, Austin Texas, August 2011 (invited oral presentation).
- (6) **Bentz, B.J.** Red trees and black beetles: Climate and bark beetle population success. College of Science, Science UnWrapped, Utah State University, Logan, Utah, March 2011 (invited oral presentation).
- (7) **Bentz, B.J. and Bracewell, R.B.** Reproductive isolation and genetic differences among *Dendroctonus ponderosae* populations: Why does it matter? North American Forest Insect Work Conference, Portland Oregon, May 10, 2011 (invited oral presentation by Bentz).
- (8) **Bentz, B.J., Vandygriff, J., Coleman, T.W., Dunlap, J., Garcia, A., Jensen, C., Maloney, P., and Smith S.** Monitoring mountain pine beetle lifecycle timing and phloem temperatures at multiple elevations and latitudes in California. Poster prepared for the Forest Health Monitoring Working Group Meeting and presented online because of cancelled meeting.  
[www.fhm.fs.fed.us/posters/posters11/WC-EM-09-01Bentz\\_FHM\\_CA\\_poster\\_2011.pdf](http://www.fhm.fs.fed.us/posters/posters11/WC-EM-09-01Bentz_FHM_CA_poster_2011.pdf).
- (9) **Bracewell, R.B. and Bentz, B.J.** The mountain pine beetle as a model of parapatric speciation? 5<sup>th</sup> North American Forest Insect Work Conference, Portland Oregon, May 10, 2011 (poster presentation by Bentz).
- (10) **Burnside, R.E., Fettig, C.J., Hayes, C.J., Kruse, J.J., and Schultz, M.E.** *Ips* demonstration (STDP) project - Status of Forest Health Protection projects. 4th Meeting

of the Alaska Entomological Society, Fairbanks, Alaska, February 2011 (oral presentation by Burnside).

(11) **Burnside, R.E., Fettig, C.J., Hayes, C.J., Kruse, J.J., and Schultz, M.E.** Factors influencing northern spruce engraver colonization of slash in interior Alaska. 5th North American Forest Insect Work Conference, Portland, Oregon, May 10, 2011 (poster presentation by Fettig).

(12) **Coleman, T.W., Grulke, N.E., Crook, D., Flint, M.L., Smith, S. and Strom, B., and Seybold, S.J.** Goldspotted oak borer: What we still don't know about biology, detection, and management. 5<sup>th</sup> North American Forest Insect Work Conference. Portland, Oregon, May 10, 2011 (oral presentation by Coleman).

(13) **Crabb, B., Powell, J., and Bentz, B.J.** Development of high-resolution pine density maps for landscape-level modeling of mountain pine beetle. 5<sup>th</sup> North American Forest Insect Work Conference, Portland Oregon, May 10, 2011 (poster presentation by Bentz).

(14) **Dallara, P.L., Flint, M.L., and Seybold, S.J.** Life history and trapping methods for the walnut twig beetle (*Pityophthorus juglandis*) in California. 59th Annual Meeting of the Entomological Society of America, Reno, Nevada, November 15, 2011 (poster presentation by Dallara).

(15) **Dix, M.E. and Gillette, N.E.** Research challenges for protecting forests and rangeland ecosystems. 59th Annual Meeting of the Entomological Society of America, Reno, Nevada, November 16, 2011 (oral presentation by Gillette).

(16) **Fettig, C.J.** Effects of fuel reduction treatments on bark beetle activity in the western U.S. 5th North American Forest Insect Work Conference, Portland, Oregon, May 12, 2011 (plenary session speaker).

(17) **Fettig, C.J.** Research on bark beetles and fire interactions in western coniferous forests. Fire and Fuels Workshop, Redding, California, June 2011.

(18) **Fettig, C.J.** Review of a three-year study on insecticide tree injection and the peer-reviewed paper "Effectiveness of two systemic insecticides for protecting western conifers from mortality due to bark beetle attack." California Forest Pest Council, Combined Weed/Insect/Disease/Animal Damage Tour, Murphys, California, July 2011.

(19) **Fettig, C.J.** Research on forest health and disturbance ecology in western coniferous forests. Ecosystem Function and Health Program Meeting, Davis, California, October 26, 2011.

(20) **Fettig, C.J., Burnside, R.E., Hayes, C.J., and Schultz, M.E.** Field evaluations of emamectin benzoate for control of birch leafminer in interior Alaska - Status of Forest

Health Protection projects. 4th Meeting of the Alaska Entomological Society, Fairbanks, Alaska, February 2011 (oral presentation by Burnside).

(21) **Fettig, C.J., Grosman, D.M., Munson, A.S., and Berisford, C.W.** Protection of individual conifers from bark beetle attack using bole sprays and systemic tree injections. 5th North American Forest Insect Work Conference, Portland, Oregon, May 12, 2011 (oral presentation by Fettig).

(22) **Fettig, C.J., McKelvey, S.R., and Dabney, C.P.** Bark beetle responses to stand structure and prescribed fire in interior ponderosa pine: Blacks Mountain. Fire and Fuels Workshop, Redding, California, June 2011 (poster presentation by Fettig).

(23) **Fettig, C.J., McKelvey, S.R., and Huber, D.P.W.** Review of the chemical ecology of *D. brevicomis*: Implications to development of a semiochemical-based tool for tree protection. 27th Annual Meeting of the International Society of Chemical Ecology, Burnaby, British Columbia, Canada, July 2011 (poster presentation by Huber).

(24) **Fettig, C.J., Munson, A.S., McKelvey, S.R., and Bush, P.B.** Potential impacts of spray deposition from applications of carbaryl to protect individual trees from bark beetle attack. 59th Annual Meeting of the Entomological Society of America, Reno, Nevada, November 16, 2011 (poster presentation by Fettig).

(25) **Fettig, C.J., Munson, A.S., and Nowak, J.T.** Why all thinnings are not created equal – factors influencing the susceptibility of forest stands to bark beetle infestations. 5th North American Forest Insect Work Conference, Portland, Oregon, May 11, 2011 (oral presentation by Nowak).

(26) **Gillette, N.E., Lu, M., Wingfield, M.J., Sun, J.-H., and Mori, S.R.** The Boomerang Project: Implications for reinvasion by a bark beetle and its fungal hitchhikers. Invited oral presentation to the USDA Forest Service, Pacific Southwest Research Station Leadership Team Meeting, Emeryville, California, October 4, 2011 (oral presentation by Gillette).

(27) **Gillette, N.E., Mori, S.R., Murray, W.J., Kelly, N.M., Webster, J.N., and Wood, D.L.** Brood tree removal and verbenone treatments mitigate mountain pine beetle risk. USDA Forest Service, Pacific Southwest Research Station Ecosystem Function and Health Program Meeting, Davis, California, October 25, 2011 (poster presentation by Gillette).

(28) **Gillette, N.E., Sun, J.-H., Lu, M., Owen, D.R., and Wingfield, M.J.** Novel interactions between a “reverse invasive” bark beetle and its newly acquired fungal associates. 59th Annual Meeting of the Entomological Society of America, Reno, Nevada, November 16, 2011 (oral presentation by Gillette).

(29) **Graves, A.D., Coleman, T.W., Rugman-Jones, P.F., Stouthamer, R., and Seybold, S.J.** The walnut twig beetle, *Pityophthorus juglandis* (Coleoptera: Scolytidae): distribution, genetic diversity, and impact on native walnuts of the southwestern U.S.

59th Annual Meeting of the Entomological Society of America, November 15, 2011, Reno, Nevada (poster presentation by Nelson).

(30) **Graves, A.D., Coleman, T.W., and Seybold, S.J.** Monitoring walnut health and decline in response to thousand cankers disease and infestation by the walnut twig beetle, *Pityophthorus juglandis*, in southern California and New Mexico. 60<sup>th</sup> Annual Meeting of the California Forest Pest Council, McClellan, California, November 15, 2011 (poster presentation by Coleman).

(31) **Hansen, E.M., Amacher, M.C., White, M.A., Van Miegroet, H, Long, J.N., and Ryan M.G.** The influence of mountain pine beetle outbreaks on carbon and nitrogen dynamics in lodgepole pine ecosystems. 5<sup>th</sup> North American Forest Insect Work Conference, Portland, Oregon, May 11, 2011 (oral presentation by Hansen).

(32) **Hicke, J.A., Hayes, J.L., Johnson, M.C, and Preisler, H.K.** Effects of bark beetle-caused tree mortality on subsequent wildfire. Mountain Pine Beetle & Fire: The Science Behind The Risks, Helena, Montana, May 4, 2011 and Interior West Fire Ecology Conference, Snowbird, Utah, November 15, 2011 (oral presentations by Hicke).

(33) **Hicke, J.A., Hayes, J.L., Johnson, M.C, and Preisler, H.K.** Effects of bark beetle-caused tree mortality on subsequent wildfire. 59<sup>th</sup> North American Forest Insect Work Conference, Portland, Oregon, May 10, 2011 (poster presented by Hicke).

(34) **Hishinuma, S.M., Coleman, T.W., Haavik, L.J., Flint, M.L., Venette, R.C., and Seybold, S.J.** Detection and field identification of the goldspotted oak borer, *Agrilus auroguttatus* (Coleoptera: Buprestidae). North American Forest Insect Work Conference, Portland, Oregon, May 10, 2011 (poster presentation by Hishinuma).

(35) **Hishinuma, S.M., Flint, M.L., Bostock, R.M., and Seybold, S.J.** Assessing thousand cankers disease severity in California. 59th Annual Meeting of the Entomological Society of America, Reno, Nevada, November 14, 2011 (oral presentation by Hishinuma).

(36) **Hishinuma, S.M., Flint, M.L., Bostock, R.M., and Seybold, S.J.** Interactions of the walnut twig beetle, *Pityophthorus juglandis*, and the fungus, *Geosmithia morbida*, in thousand cankers disease of walnuts in California. North American Forest Insect Work Conference, Portland, Oregon, May 10, 2011 (poster presentation by Hishinuma).

(37) **Jones, M.K., Coleman, T.W., Graves, A.D., Flint, M.L., and Seybold, S.J.** Sanitation treatments for oak wood infested with the goldspotted oak borer. 60<sup>th</sup> Annual Meeting of the California Forest Pest Council, McClellan, California, November 15, 2011 (poster presentation by Jones).

(38) **Kelsey, R.G., Beh, M., Shaw, D., and Manter, D.K.** Ethanol concentrations in sapwood of coast live oak with and without *Phytophthora ramorum* cankers. North

American Forest Insect Work Conference, Portland, Oregon, May 10, 2011 (poster presentation by Kelsey).

(39) **Lerch, A., Bentz, B.J., D. Blackford, D., Thurman, A., and Raffa, K.F.** Predicting mountain pine beetle attack and delayed tree mortality in fire-injured lodgepole and ponderosa pines, poster prepared for the Forest Health Monitoring Working Group Meeting and presented online because of cancelled meeting.  
<http://fhm.fs.fed.us/posters/posters11/posters11.shtml>

(40) **Lundquist, J.E.** Using climate zones and latitudinal transects to predict insect pest distributions across large geographic expanses – *Trypodendron* ambrosia beetles in Alaska. Classrooms for Climate Symposium, Chugach National Forest and the University of Alaska, Anchorage, Alaska, May 6, 2011 (oral presentation + abstract).

(41) **Lundquist, J.E.** Insect pests of forests in Alaska. Chugachmiut Training Program, Soldotna, Alaska, September 7, 2011 (oral presentation).

(42) **Lundquist, J.E.** Assessing pest impacts under a changing climate. 59th Annual Meeting of the Entomological Society of America, Reno, Nevada, November 16, 2011 (oral presentation).

(43) **Lynch A.M.** Climate change and insect outbreaks in southwestern high elevation forests. 59th Annual Meeting of the Entomological Society of America, Reno, Nevada, November 16, 2011 (invited oral presentation).

(44) **Lynch A.M.** Recognizing and dating evidence of insect activity. University of Arizona, Laboratory of Tree-Ring Research, DendroEcology Short Course. Tucson Arizona, May 13, 201 (oral presentation).

(45) **Nelson, L.J., Bostock, R.M., Roubtsova, T., Nguyen, T., Hishinumua, S.M., Dallara, P.L., Graves, A.D., Flint, M.L., and Seybold, S.J.** Characterization of volatile compounds associated with thousand cankers disease and walnut twig beetle in northern California black walnut, *Juglans hindsii*. 59th Annual Meeting of the Entomological Society of America, Reno, Nevada, November 16, 2011 (poster presentation by Nelson).

(46) **O'Connor C.D., Falk D.A., Lynch A.M., Swetnam T.W., Loehman R.A., and Wilcox C.P.** Disturbance interactions on an Arizona Sky Island. University of Arizona Institute for the Environment, 1 February 2011.

(47) **Powell, J.A. and Bentz, B.J.** Emerging at the right time, stopping at the right place, and scaling up the right way: Phenology and differential motility describe patterns of bark beetle outbreak, SIAM Dynamical Systems Annual Conference, Snowbird, Utah, May 2011 (oral presentation by Powell).

(48) **Preisler, H.K. Hicke, J.A., Ager, A.A., and Hayes J.L.** Influence of climate and weather on observed spatiotemporal patterns of mountain pine beetle outbreaks in

Washington and Oregon. Ecological Society of America Annual Meeting, Austin, Texas, August 7–12, 2011 (oral presentation by Preisler).

(49) **Progar, R.A., Jorgensen, C., Blackford, D., Mocettini, P., Halsey, R., Cluck, D., Costello, S., Eager, T., Munson, S., and Steed, B.** Efforts to reduce mountain pine beetle attack in lodgepole pine using verbenone. 59th Annual Meeting of the Entomological Society of America, Reno, Nevada, November 16, 2011 (oral presentation by Seybold).

(50) **Progar, R.A., Scott, D., Schmitt, C., Spiegel, L., Hostetler, B., Wilhite, B., Eglitis, A., Chadwick, K., Mehmel, C., Goheen, D., Acker, S., Ganio, L., Hart, S., and Blum, A.** The role of bark beetles and wood borers in the survival of fire-injured trees in Oregon and Washington. Plenary Symposium, “Bark Beetle and Fire Interactions in Western Coniferous Forests” at the 5th North American Forest Insect Work Conference, Portland, Oregon, May 12, 2011 (oral presentation by Progar).

(51) **Seybold, S.J.** Describing and detection populations of the walnut twig beetle: The hyperactive vector of thousand cankers disease, Invited lecture at the 102<sup>nd</sup> Annual Meeting of the Northern Nut Growers Association, "Genetics, ecology and management of walnuts and butternut," July 17–21, 2011, Utah State University, Logan, Utah, July 19, 2011 (invited oral presentation).

(52) **Seybold, S.J.** Intracontinental invasive species: The walnut twig beetle and goldspotted oak borer as case studies of emerging threats to forest and agroecosystems in North America. Invited department seminar to the Department of Entomology, Pennsylvania State University, State College, Pennsylvania, July 8, 2011 (invited oral presentation).

(53) **Seybold, S. J.** Summary of the status of goldspotted oak borer research. Oak Health in Southern California: Research and Technology Development Needs Assessment, San Diego, California, January 26, 2011 (oral presentation).

(54) **Seybold, S.J.** The walnut twig beetle: An intracontinental invasive species that threatens *Juglans* in North America, Invited lecture at the 3<sup>rd</sup> Biennial Schatz Tree Genetics Colloquium, "Genetics, Ecology and Management of Walnuts and Butternut," July 11-12, 2011, Penn State Mont Alto, Mont Alto, Pennsylvania, July 11, 2011 (invited oral presentation).

(55) **Seybold, S.J.** Thousand Cankers Disease in California and the U.S. 42<sup>nd</sup> Annual Tri-County Walnut Day, Visalia, California, February 3, 2011 (invited oral presentation).

(56) **Seybold, S.J.** Walnut twig beetle and its aggregation pheromone: Developing a detection tool for the vector of thousand cankers disease. Presentation to the Thousand Cankers Disease Workshop co-sponsored by the Walnut Council, the USDA Forest Service Northern Research Station Hardwood Tree Improvement Research Center, and

the USDA Forest Service Northeastern Area State and Private Forestry, Wright Forestry Center, West Lafayette, Indiana, March 31, 2011 (invited oral presentation).

(57) **Seybold, S.J.** 1) Walnut twig beetle and thousand cankers disease: A history of the problem in the western U.S. and 2) Walnut twig beetle: Origins of invasive populations and the development of a detection and monitoring tool. Two invited lectures at the Conference on Thousand Cankers Disease and Emerald Ash Borer in the Eastern United States, November 30-December 2, 2011, University of Tennessee, Knoxville, Tennessee, December 1, 2011 (invited oral presentations).

(58) **Seybold, S.J.** Walnut twig beetle and thousand cankers disease: Status of the problem in California and the U.S. Invited department seminar to the Department of Plant Pathology, University of California, Davis, Davis, California, April 4, 2011 (invited oral presentation).

(59) **Seybold, S.J. and Coleman, T.W.** Basic research is leading to the development of an IPM program for the invasive goldspotted oak borer in southern California: A combined effort lead by Forest Service R&D and FHP. Presentation in the D5 Working Group Technical Session, Forest Entomology and Pathology, Forest Health and Fire Track, Biosecurity: Partnerships between Research and Management to Mitigate the Impact of Invasive Species in the Western U.S., R. Progar, Organizer. The Society of American Foresters National Convention, Honolulu, Hawaii, November 4, 2011 (invited oral presentation by both authors).

(60) **Seybold, S.J., Coleman, T.W., and Graves, A.D.** A tale of two hardwood invasives: the research and management response of Forest Service R&D and FHP to gold-spotted oak borer and walnut twig beetle. 59th Annual Meeting of the Entomological Society of America, Reno, Nevada, November 16, 2011 (invited oral presentation by Seybold).

(61) **Seybold, S.J. and Hishinuma, S.M.** Development of an early detection tool for walnut twig beetle and impact of thousand cankers disease at the *Juglans* Collection of the USDA ARS National Clonal Germplasm Repository. Annual Meeting of the National Plant Diagnostic Network, Winters, California, November 9, 2011 (oral field presentation by both authors).

(62) **Smith S., Bentz, B.J., Vandygriff, J., Coleman, T.W., Garcia, A., Jensen, C., and Maloney, P.** Mountain pine beetle life cycle timing at multiple elevations and latitudes in California. The Society of American Foresters National Convention, Honolulu, Hawaii, November 2-4, 2011 (poster presentation by Smith).

(63) **Smith S., Bentz, B.J., Vandygriff, J., Coleman, T.W., Garcia, A., Jensen, C., and Maloney, P.** Mountain pine beetle life cycle timing at multiple elevations and latitudes in California. 60<sup>th</sup> Annual Meeting of the California Forest Pest Council, McClellan, California, November 16, 2011 (oral presentation by Smith).

## **Media Recognition**

(1) **Bentz, B.J.** Our dying forests: Beetles gnaw through Utah, West, September 22, 2011, Salt Lake Tribune news article authored by Brandon Loomis, featuring information from an interview with Bentz.

(2) **Gillette, N.E.** The paper by Lu et al. (2011) *Ecology* 92:2013–2019 was selected by the editorial staff of the journal to provide the cover photo for the issue in which the article appeared.

(3) **Gillette, N.E.** The paper by Lu et al. (2011) *Ecology* 92:2013–2019 was selected by Mark Lonsdale, a Member of the Faculty of 1000 (F1000), for placement of this work in their library of the top 2% of published articles in biology and medicine.

(3) **Gillette, N. E.** How a fungus boosts a beetle’s invasion, *American Scientist* “Science Observer” news article by Elsa Youngsteadt. *Am. Sci.* 100:24–25.  
[www.americanscientist.org](http://www.americanscientist.org)

(4) **Negrón, J.F.** Proposed federal cuts could hit home: budget reductions target science programs, locally-staffed agencies, February 20, 2011, *Fort Collins Coloradoan* news article, pp. B1–B2, authored by Bobby McGill, featuring a picture of Negrón during an outreach event with a high school student.

(5) **Negrón, J.F.** Bark beetle kill has little effect on fire danger, March 19, 2011, *Fort Collins Coloradoan* news article, pp. A3–A-4, authored by Bobby McGill, featuring information from a technical interview with Negrón.

## **Technical Assistance Visit**

(1) **Negrón, J.F.** Worked with E.A. Willhite (USDA FS FHP, R6) for two weeks in May, 2011, at the Sierra Gorda Biosphere Reserve of Guanajuato in Central Mexico. The technical assistance visit was a request to Forest Service International Programs from Peace Corps Mexico and the Agency for International Development. During the visit Negrón and Willhite evaluated an outbreak of *Dendroctonus mexicanus* in *Pinus cembroides* forests; made recommendations for management; discussed impacts; and presented a two-day workshop to 23 foresters from six different agencies.