Conservation Matters: Contributions from the Conservation Committee

With this column, we kick off one of the more visible products of the Society's Conservation Committee – Conservation Matters. The double entendre speaks well to our goals for the column. We plan to bring conservation concerns and developments that impact our membership to the forefront. A forum for our committee members to discuss the issues, events, and research that excites and motivates them. But just as importantly, we hope to demonstrate that conservation does matter and that the decline of ecosystems and the Lepidoptera they support impact all of our interests. Collectors, watchers, researchers…, anyone and everyone with an interest in moths and butterflies is affected.

It's worth noting that this column will reflect various viewpoints from the committee. It won't just include my own opinions in every issue, telling you over and over again about my particular concerns. Rather, we hope that as the column matures, it will truly reflect the full range of issues, threats and strategies that impact our beloved insects. Dave Wager's kick-off for this column is exemplary – a unique assessment of an ecological threat that most are completely unaware of. As I've watched this particular disaster unfold right in my own back yard, attended strategy meetings with impacted stakeholders, and tried to find the funding required to push eradication during the initial discovery phase, I've been amazed by the lack of interest by the general population. I think Dave's column brings the impact home to us – ash feeding specialist moths are doomed if the dire predictions are correct. I honestly don't know of any workable strategies for averting this "mini-extinction" episode, but maybe someone in our membership has a great idea. And that's the point – we bring this and other issues before you because it matters.

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Chair, Conservation Committee

Emerald Ash Borer Threatens Ash-feeding Lepidoptera

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Introduced species can have devastating effects on resident biotas. The accidental release of two exotic plant pathogens, chestnut blight and Dutch elm disease, to North America, are two well known examples. Foreign insects that have had significant impact on our flora and fauna include the balsam woolly adelgid, hemlock woolly adelgid, and the introduced lady beetles that appear to have displaced native species.

The Emerald Ash Borer (*Agrilus planipennis*) (Buprestidae), a native to Southeast Asia, was first reported in the United States in July 2002 in the vicinity of Detroit, Michigan—likely it had become established as much as a decade previously. It is believed to have been introduced in wooden shipping pallets at ports off of Lake Huron (Haack et al. 2002). While its natural rate of spread has been estimated to be a half-mile per year (McCullough et al. 2005), human movement of nursery stock and infected (fire) wood has greatly accelerated the insect's dispersal—the beetle is now established and adversely affecting over 40,000 square miles in Illinois, Indiana, Maryland, Michigan, Ohio, and southern Ontario (Anonymous 2006, http://www.emeraldashborer.info/index.cfm). No doubt, additional outlying infestations are as yet undetected, and will only be recognized as symptoms of infestation become evident and attacked trees are located through detection surveys.

Larvae of the Emerald Ash Borer tunnel between the bark and wood, largely through the phloem, destroying the host tree's ability to conduct nutrients (Haack et al. 2002). Heavily infested trees are killed; in some Midwestern forests and woodlands the mortality approaches 100%. The EAB is believed to have killed more than 20 million ash trees in the Midwest since 2002 (Anonymous 2006, http://www.emeraldashborer.info/index.cfm). Moreover, infestations may linger killing ash seedlings that regenerate under their fallen parents as well as the sucker shoots and stump sprouts that issue from dying trees, once their girth approaches an inch or so.

All of our eastern North American ash (*Fraxinus*) species may be susceptible, regardless of whether they are growing in wetlands, floodplains, or upland forests. If the beetle's march continues unchecked, the ecological impacts will be grave. Ash is a co-dominant tree in many terrestrial plant communities, especially in rich, mesic woodlands, cove forests, swamps, floodplain and

bottomland forests. White ash is being systematically eliminated from upland forest systems in the upper Midwest. Ash-hickory glades represent one of Connecticut's unique plant community types (Metzler and Barrett 2006). In southeastern Michigan, black ash swamps (the principal habitat of Canadian Sphinx, *Sphinx canadanesis*) have suffered devastating mortality (John Shuey pers. comm.). The consequences are compounded: ash die-off in these swamps often allows the exotic glossy buckthorn to flourish.

If ash suffers the same fate as chestnut, many *Fraxinus* specialists will perish in the wake of the beetle's spread. Table 1 lists 21 species of Nearctic Lepidoptera believed to specialists or largely dependent on ash. Additional ash-feeding oligophags may also be affected: e.g., the Fringe-tree Sallow, *Adita chionanthi* (Noctuidae) also eats fringe-tree; the Lilac Leafminer, *Caloptilia syringella* (Gracillariidae) feeds on ash and lilac; and the Fawn Sphinx, *Sphinx kalmiae* (Sphingidae) and Lilac Borer, *Podosesia syringae* (Sesiidae), feed on a range of plants in the olive family (Oleaceae). It seems unlikely that species exploiting introduced hosts such as lilac (*Syringa*) and privet (*Ligustrum*), would persist many decades using only exotic hosts in urban and suburban landscapes. Likely they would eventually suffer the same fate as Ailanthus Silkmoth (*Samia cynthia*)—extirpation. And even if they were to persist, their population demographics and (genetics) would be massively restructured. Natural enemies, specialized on ash-feeding hosts, of course, would also plummet in distribution and abundance.

The threat to ash-feeding moths appears to be especially great in that all members of the genus *Fraxinus* are believed to be susceptible. There would be little hope for the long-term survival of the species in Table 1 if the EAB were to spread throughout North America without natural enemies or other factors to check the beetle's impacts. One can hope that the dire predictions promulgated by the USDA, Forest Service and others are exaggerated, but given what has transpired in portions of the Midwest, it is none too soon to take all reasonable measures to slow the insect's spread and ameliorate its impacts once established. It goes without saying that local or national measures to prevent or diminish further biological introductions deserve the Society's full support.

Members are urged to make an effort to sample the insect faunas of ash and other Oleaceae, in currently unaffected ecosystems. Such baseline data, especially if quantitative or effort-based, will allow us to more fully understand the beetle's impacts.

Scientific Name	Family	Comments
Caloptilia fraxinella	Gracillariidae	leafminer/shelter former
Caloptilia n. sp.	Gracillariidae	leafminer/shelter former
Ceratomia undulosa	Sphingidae	leaf feeder
Copivaleria grotei	Noctuidae	leaf feeder
Homoncocnemis fortis	Noctuidae	leaf feeder
Hydrelia* near *inornata	Geometridae	leaf feeder
Manduca jasminearum	Sphingidae	leaf feeder
Olceclostera angelica	Apatelodidae	leaf feeder; also on *Syringa*
Plagodis kuetzingi	Geometridae	leaf feeder
Marmara basidendroca	Gracillariidae	bast miner
Marmara corticola	Gracillariidae	bast miner
Marmara fraxinicola	Gracillariidae	bast miner
Papaipema furcata	Noctuidae	new shoot borer
Philtraea latifoliae	Geometridae	leaf feeder
Philtraea surcaliforniae	Geometridae	leaf feeder; diet breadth in need of study
Podosesia aureocincta	Sesiidae	trunk and stem borer
Sphinx canadensis	Sphingidae	leaf feeder; closely tied to *F. nigra*
Sphinx chersis	Sphingidae	leaf feeder; also on *Ligustrum* in suburban and urban areas.
Sphinx franckii	Sphingidae	leaf feeder
Zelleria hepariella	Yponomeutidae	leaf feeder
Zelleria ? semitincta	Yponomeutidae	*F. dipetala* leaf feeder, CA

Table 1. *A preliminary list of North American Fraxinus specialists. No doubt there are additional ash-feeders that belong on this list—much remains to be learned about life histories of Texan and western North American Lepidoptera. Members who know of other ash specialists are urged to contact John Shuey (jshuey@TNC.ORG) or Dave Wagner (david.wagner@uconn.edu).*

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Emerald Ash Borer (*Agrilus planipennis*) (left to right). Adult on penny. Detail of adult. Last instar. Dead ash trees. Images from "Forestry Images" (*http://www.forestryimages.org*). See update on pp. 61.