

International Union of Forest Research Organizations

IUFRO Meeting Report Form

Organizers of IUFRO meetings and IUFRO focal persons at IUFRO co-sponsored meetings, respectively, are kindly requested to fill in and return this form within two weeks after the meeting or by a given deadline by email (wolfrum@iufro.org). This information will be posted at the relevant IUFRO web pages and may be used for IUFRO News and the IUFRO Annual Report.

(Note: Save this file under a new name and write directly into the form.)

1) IUFRO focal person/meeting organizer:

Name: Quentin Guignard

Function in IUFRO: Deputy coordinator WP 7.03.16 Behaviour and chemical ecology of Forest insects

Email: quentin.guignard@nrca-rncan.gc.ca

2) Meeting data:

Full title of the meeting: 39th Annual Meeting of the International Society of Chemical Ecology (ISCE)

Date and venue: 14-18th July 2024

Meeting website: <https://www.isce2024.cz/web/>

Full title of the symposium: Chemical ecology of forest insects

Number of participants: 15 talks (2 sessions) and 13 posters

Countries represented: 13

3) Organization of the meeting:

All IUFRO Units involved:

WP 7.03.16 "Behaviour and chemical ecology of Forest insects",
Task Force "Precision Pest Management in Forest Ecosystems"

Host organization(s) and sponsor(s): International society of chemical ecology; deputy coordinator of WP 7.03.16 "Behaviour and chemical ecology of forest insects" Anna Jirošová was chair of the organizing committee for the ISCE annual meeting (see <https://www.isce2024.cz/web/>).

4) Meeting report (*max. 100 words per paragraph*)

a) Background information (meeting context)

Forests are among the oldest and largest ecosystems on earth and offer a large number of niches for insects to live in. Insects have developed diverse tools to complete their life cycle and increase their fitness, some of which are unique to forest ecosystem. Among these tools are adaptations to facilitate chemically-mediated interactions among organisms that are tuned to forest environments. Biological interactions among trees, insects and their associated microbiome (e.g., fungus, nematodes, bacteria) are often mediated by semiochemicals. Given the large ecological, economical and cultural importance of forest, understanding these interactions is important. In recent years, a few forest insect outbreaks have received a lot of public attention (e.g., *Ips typographus*), highlighting the need to find solutions to manage pest insects in forests. The aim of this symposium is to bring together scientists across the world to discuss their latest research in this field, share their knowledge and provide networking opportunities.

b) Key issues discussed/latest findings in the field (bullet points or text)

Thank you very much for your kind cooperation!

The symposium focused on the chemical ecology of forest insects, covering bark beetle management, plant responses to insect attacks, the development of new attractants, and a poster session featuring diverse research topics.

- **Bark Beetle Management**

Presentations lead by plenary speaker Prof Sigrid Nether explored factors influencing bark beetle infestations, including tree stress, host selection, and semiochemical-based management strategies. Studies examined the role of non-host volatiles, verbenone, synthetic baits, and host volatiles in controlling *Ips* species and other bark beetles. Research also highlighted the interactions between bark beetles, fungi, and host trees.

- **Plant Responses to Insects**

This session addressed how trees defend themselves against insect herbivory. Research focused on Eucalyptus and spruce responses to insect egg deposition, feeding, and fungal infection, as well as the influence of leaf waxes and gene expression changes triggered by defoliation. Some studies also explored how plant traits influence insect behavior, such as saprophagous feeding opportunities for longhorn beetle larvae.

- **Development of New Attractants**

Presentations in this category focused on semiochemical communication and pheromone-based attractants for beetle management and conservation. Topics included the aggregation pheromone of *Cyrtogenius luteus*, chemical ecology of cerambycid beetles, and applications of pheromones for conserving saproxylic beetles.

- **Posters**

The poster session showcased a wide range of studies on insect chemical communication, physiology, and pest management. Key topics included semiochemical-mediated flight behavior in *Dendroctonus ponderosae*, olfactory proteins in *Xyleborus affinis*, and pheromone biosynthesis genes in *Ips typographus*. Other research investigated the role of volatile organic compounds in multitrophic interactions, bark beetle metabolic pathways, gut microbiomes, and novel trapping methods. Additionally, physiological responses of *Picea abies* to drought and bark beetle infestations were examined.

c) Conclusions (if possible, summarize key conclusions across presentations):

This symposium highlighted the critical role of chemical ecology in understanding and managing forest insect populations. Across multiple sessions, researchers presented insights into the chemical interactions between bark beetles, their hosts, and associated microbes, as well as plant responses to insect attacks. Studies on semiochemicals and pheromone-based strategies demonstrated promising avenues for both pest management and conservation efforts.

Key takeaways included:

- The importance of tree stress and volatiles in bark beetle host selection and infestation dynamics.
- Advances in the use of semiochemicals, such as non-host volatiles and verbenone, for integrated pest management.
- The role of plant defenses, including chemical and gene expression changes, in mitigating insect herbivory.
- The potential for pheromone-based attractants in both pest control and conservation of endangered beetle species.
- Novel findings on bark beetle olfactory mechanisms, metabolism, and microbial associations, opening new doors for future control strategies.

Overall, the symposium reinforced the need for interdisciplinary approaches combining chemical ecology, forest entomology, and molecular biology to develop sustainable pest management strategies. Future research should focus on refining semiochemical applications, understanding the ecological impacts of chemical interventions, and integrating chemical cues into broader forest health monitoring programs. The discussions and findings presented serve as a foundation for continued innovation in managing forest insect populations while maintaining ecological balance.

Thank you very much for your kind cooperation!

d) Outlook to future activities (proceedings, future meetings, other):

The WP 7.03.16 “Behaviour and chemical ecology of Forest insects”, Task Force “Precision Pest Management in Forest Ecosystems” and the WP.7.03.13 “Biological control of forest insects and pathogens” are discussing having a meeting in Pretoria (South Africa) on the week of the 27th of October 2025.

4) Photos

Caption: Participants to the 39th ISCE annual meeting.

Credit (not protected by copyright):



5) Other information:

- a) *Communication activities (dissemination of information about the meeting; promotion of IUFRO)*

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b) *Related publications /websites*

Symposia program in ISCE Prague

14:25–16:15 S4 (part I): Chemical ecology of forest insects Room Z2

Chair: Quentin Guignard

14:25–14:45 Sigrid Netherer: *(Why) do spruce bark beetles prefer drought stressed trees?*

14:45–15:00 Somia Afzal (student): *Towards push-pull control of an invasive bark beetle, *Ips grandicollis*, using non-host volatiles and semiochemicals from sympatric species*

15:00–15:15 Tobias Frühbrodt (student): *the potential of verbenone to complement the integrated management of *Ips typographus* in Central Europe*

15:15–15:30 Antonioni Moliterno (student): *Does beetle size influence olfactory selection of suitable host trees? the effect of beetle size on trap catches and electroantennographic (EAG) response to 1,8-cineole and (+)-isopinocampone in female *Ips typographus**

15:30–15:45 Petr Doležal: *Options in the use of synthetic baits against the Central European pine bark beetles*

15:45–16:00 Dineshkumar Kandasamy: *Styrene mediates interactions among spruce bark beetle, fungus and host tree*

16:00–16:15 Monika Hilker: *Trees respond to insect eggs on their leaves by improved defense against larvae*