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Using a multi-lure approach for trapping Cerambycidae in high risk areas for the introduction of bark and wood boring pests in Austria

Gernot Hoch¹, James Connell¹ & Alain Roques²

¹ BFW Austrian Research Centre for Forests, Vienna, Austria

² INRA Zoologie Forestiere, Orleans, France

Woodborers arriving in **wood packaging material**
(e.g. for stones imported from China)



Interceptions of woodboring beetles in WPM from China inspected in Austria

	2015	2016	2017
No. inspected consignments	382	377	186
Living woodborers present	10.2 %	19.6 %	17.7 %



Regulation (EU) 2016/2031 of the European
Parliament of the Council of 26 October 2016
on protective measures against pests of plants

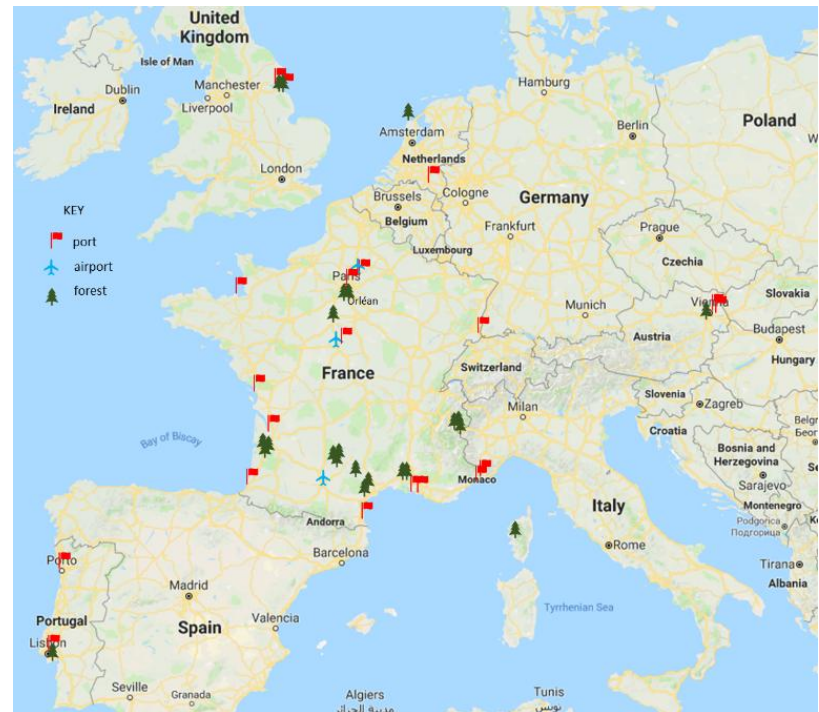


Project: MULTITRAP

Multi-lure and multi-trap surveillance for invasive tree pests

Neil Audsley, Fera, UK
Alain Roques, INRA, France
Gernot Hoch, BFW, Austria
Antoon Loomans, NVWA, Netherlands
Edmundo De Sousa, INIAV, Portugal
Jeremy Allison, Can. For. Serv., Canada
Troy Kimoto, CFIA, Canada
Damon Crook, USDA-APHIS, USA

Joint study: Testing a multi-lure approach for trapping cerambycids and other bark-/woodboring beetles at ports of entry



Background

- Sex and aggregation **pheromones** and **kairomones** (host volatiles, bark beetle pheromones) known for many cerambycid species (reviewed in Millar & Hanks 2017)
- Blends of several pheromones used in experiments in North America (e.g. Hanks et al. 2012, Hanks et al. 2018, Millar et al. 2018): **Multi-lures feasible for trapping many cerambycids**
- Multi-lure (ethanol, α -pinene; frontalin, ipsenol, ipsdienol) traps successfully tested to catch woodborers (particularly Scolytinae) at **ports of entry in Italy** (Rassati et al. 2014)
- Multi-component blends for trapping Cerambycidae at ports of entry in **France** (PORTRAP projects) (Fan et al. 2018)

Lures used in MULTIRAP

based on previous experiments by project partner INRA

Pheromones

Fuscumol (= geranyl acetol): pheromone of certain species in Aseminae/Spondylidinae, attractive for many Lamiinae

Fuscumol acetate: Attractant for some Lamiinae

Geranyl acetone: Fuscumol synthesized by reduction of geranyl acetone

Monochamol: Pheromone of *Monchamus* (Lamiinae)

3-hydroxy-2-hexanone: Pheromone of many Cerambycinae

2-methyl-1-butanol: Pheromone component of several Cerambycinae

2,3-hexanediol: Pheromone component of many Cerambycinae

Prionic acid: Female produced sex pheromone of *Prionus* spp.

Blend 1

Blend 2

Blend 3

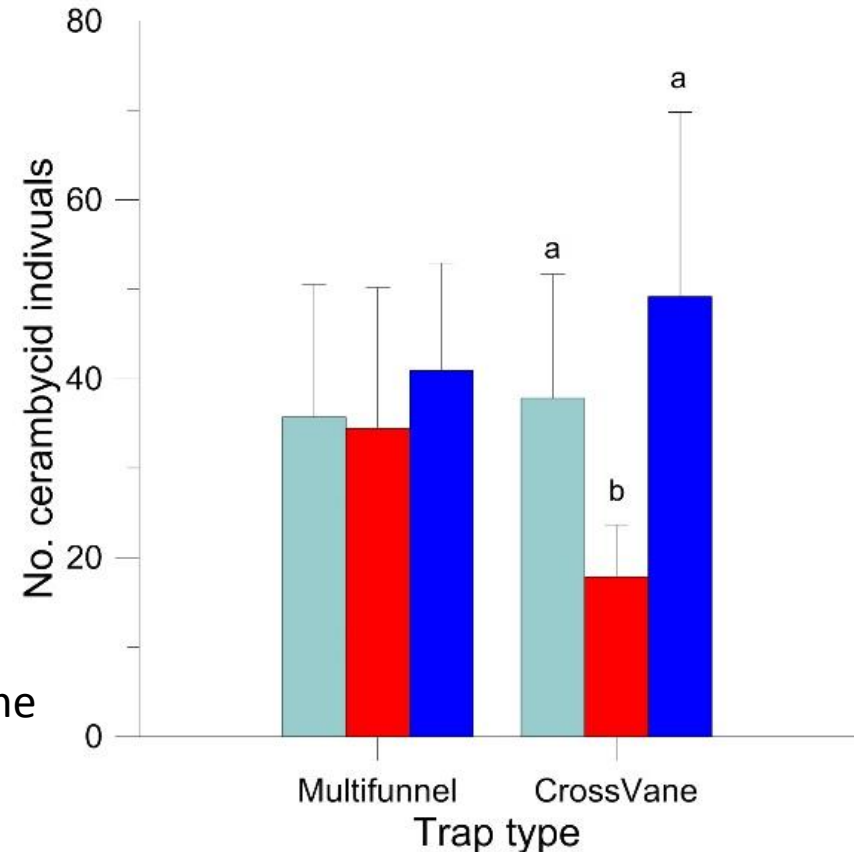
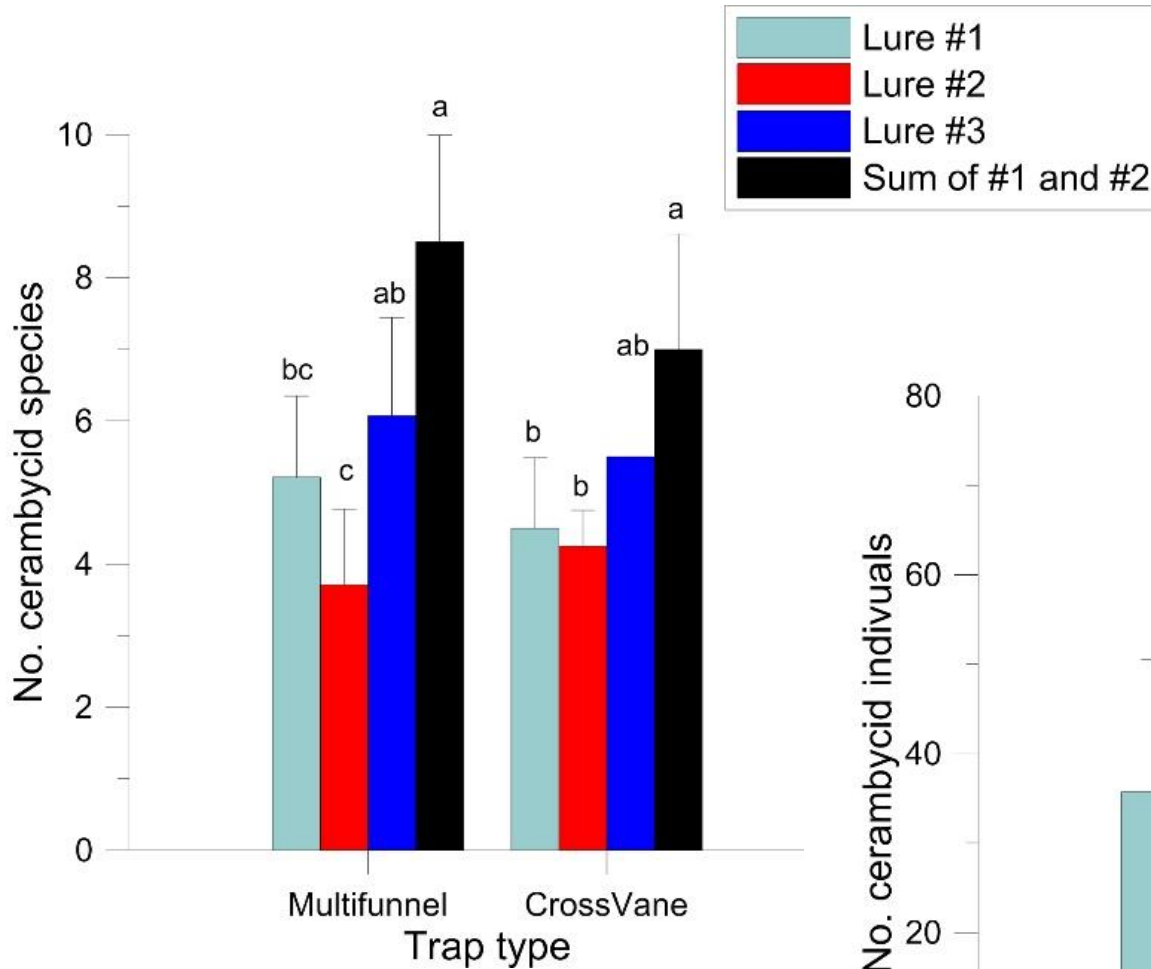
Kairomones

Ethanol and α -Pinene: Attractive kairomone for many bark and wood boring beetles

add

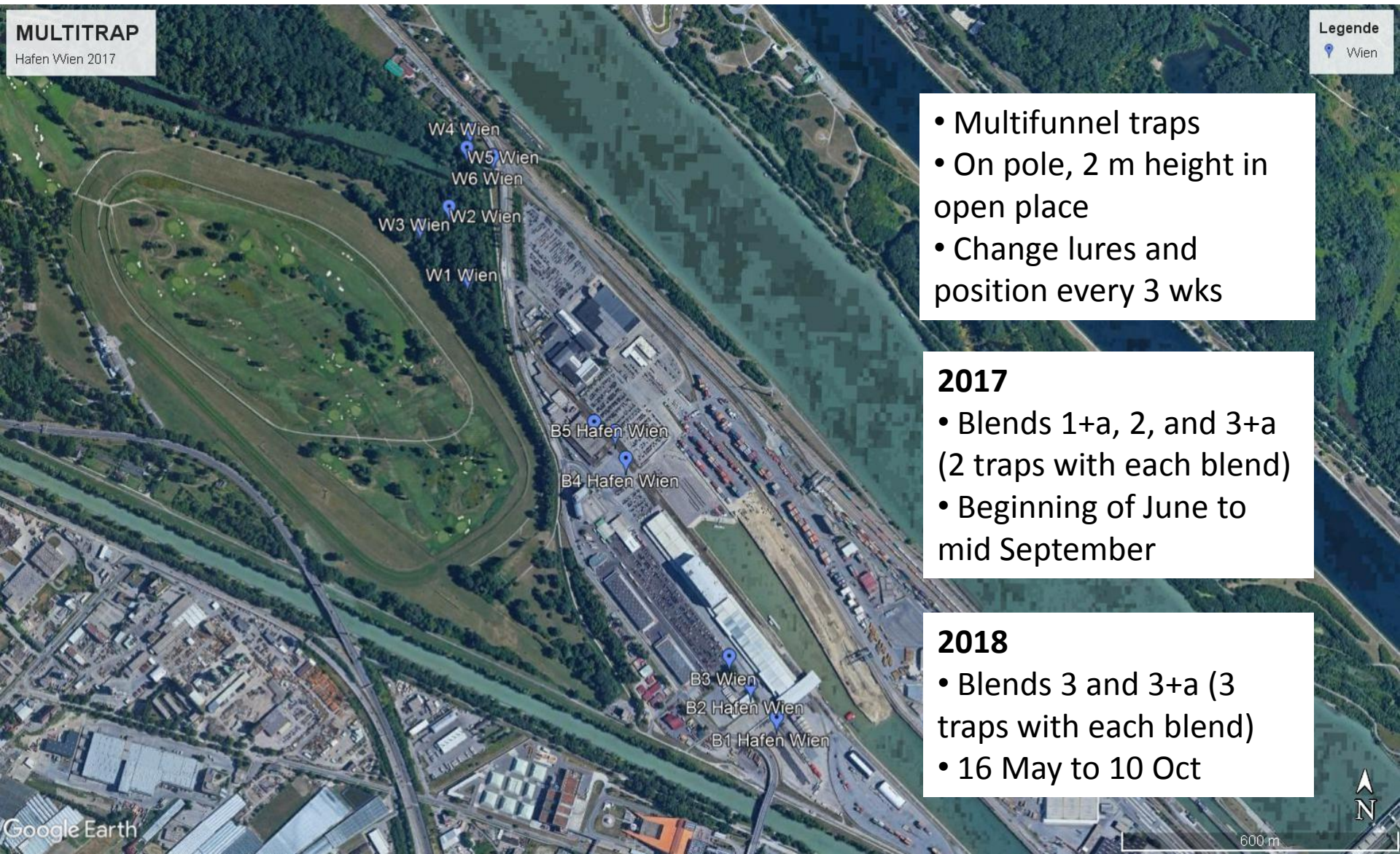
(Hanks et al. 2012, Millar & Hanks 2017, Sweeney et al. 2010, Barbour et al. 2011)

All MULTITRAP Experiments, combined results FR, AT, NL, UK, 2017



Comparison of the mean trappings per lure and per trap type. Different letters in the same type of trap indicate signif. differences (Friedmann's Q test followed by Dunn–Nemenyi multiple comparison test, $P < 0.05$).

Trapping in high risk areas: Port of Vienna



MULTITRAP
Hafen Wien 2017

Legende
Wien

- Multifunnel traps
- On pole, 2 m height in open place
- Change lures and position every 3 wks

- 2017**
- Blends 1+a, 2, and 3+a (2 traps with each blend)
 - Beginning of June to mid September

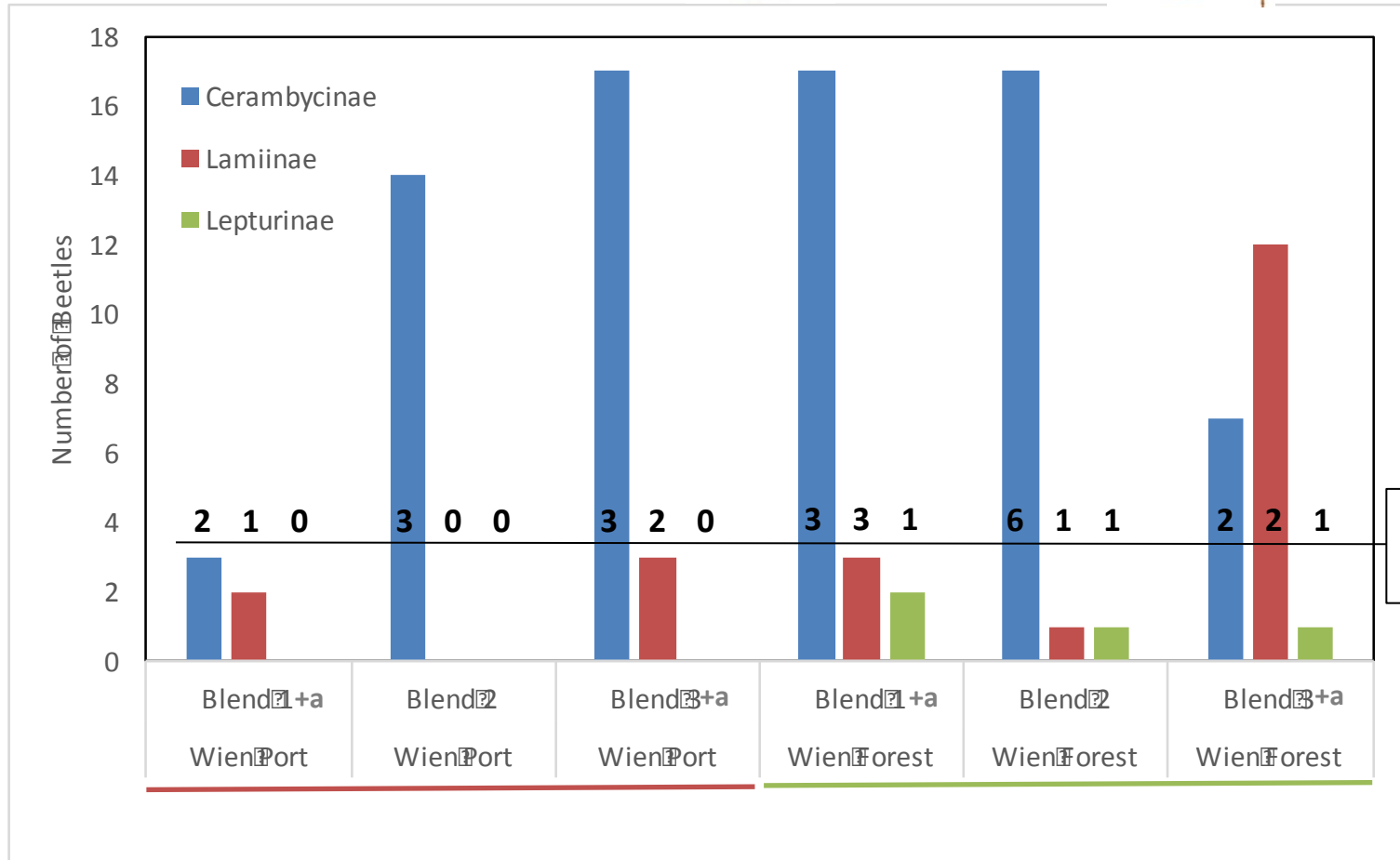
- 2018**
- Blends 3 and 3+a (3 traps with each blend)
 - 16 May to 10 Oct







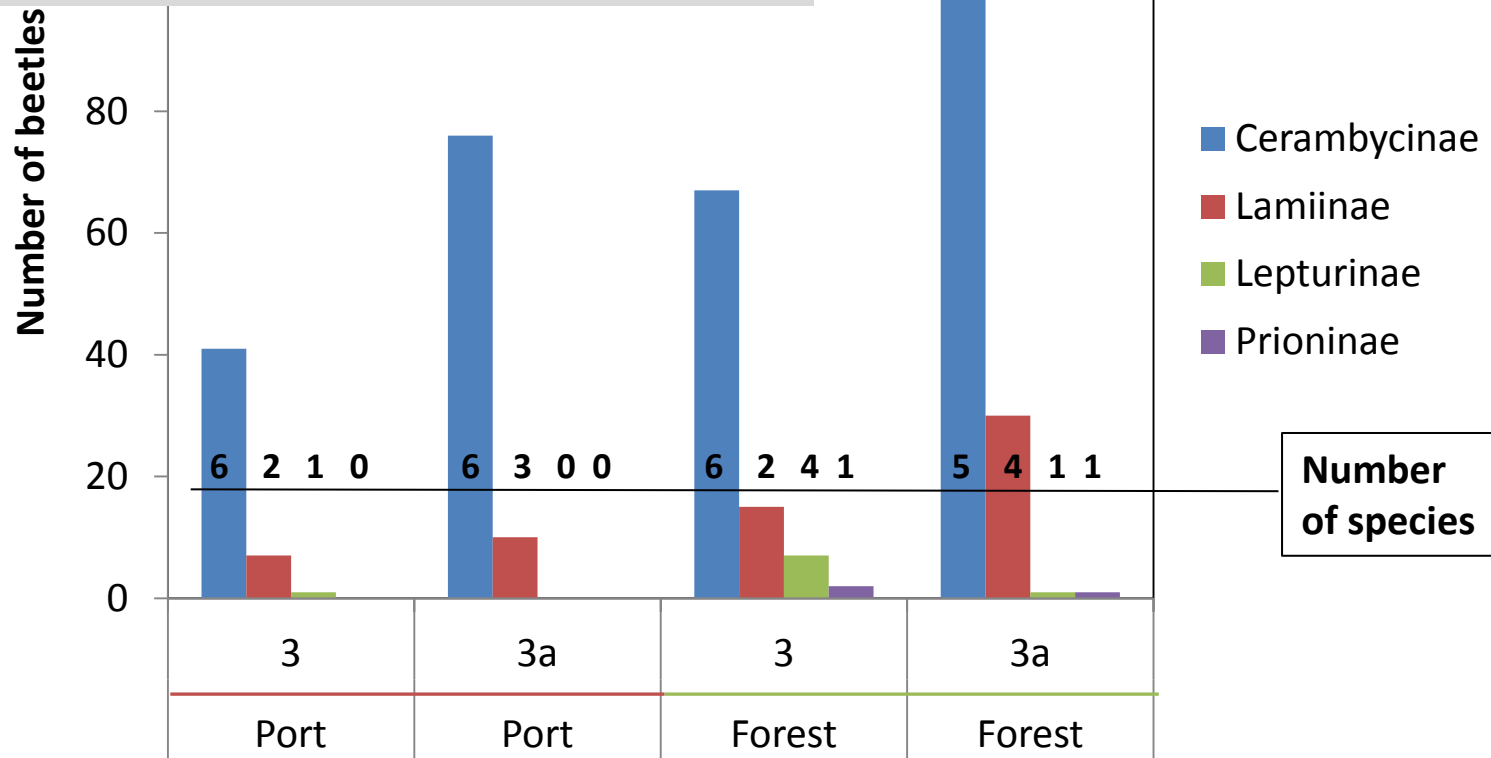
Port of Vienna, 2017



Number of specimens from different subfamilies caught in different blends in port and in surrounding forest in 2017

Port of Vienna, 2018

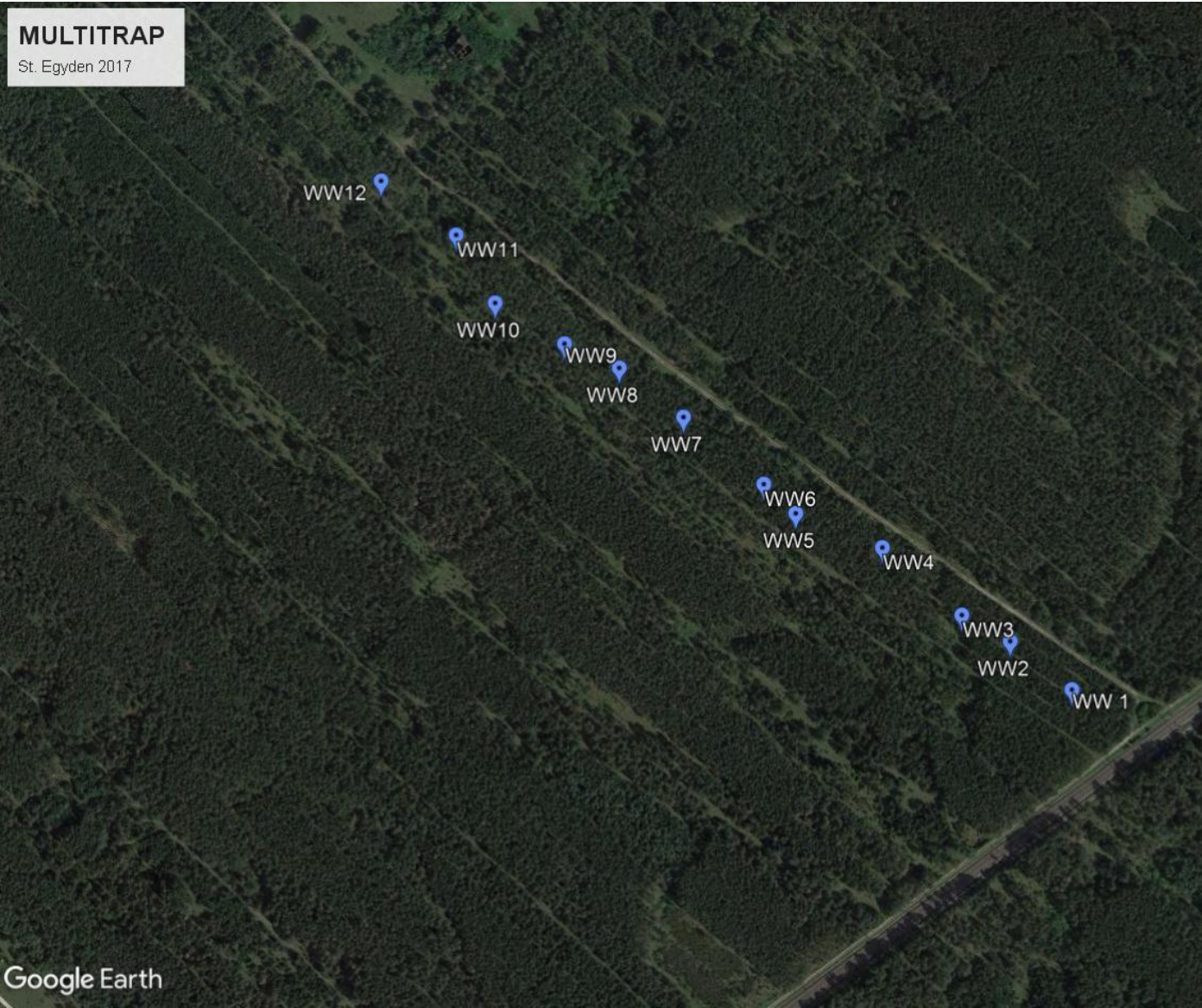
- 28 cerambycid species found in 2 years
- Cerambycid fauna of Vienna: 57 species recorded in this district (Howorka, 2018)
- no non-native Cerambycid



Number of species: 9 9 13 11 (Total: 21)

Number of specimens from different subfamilies caught in different blends in Port of Vienna and in surrounding forest in 2018

Trapping in forest: Austrian pine forest, Neunkirchen



MULTITRAP

St. Egyden 2017

- Multifunnel traps and cross vane traps
- On pole, 2 m height in open place
- Change lures and position every 3 wks

2017

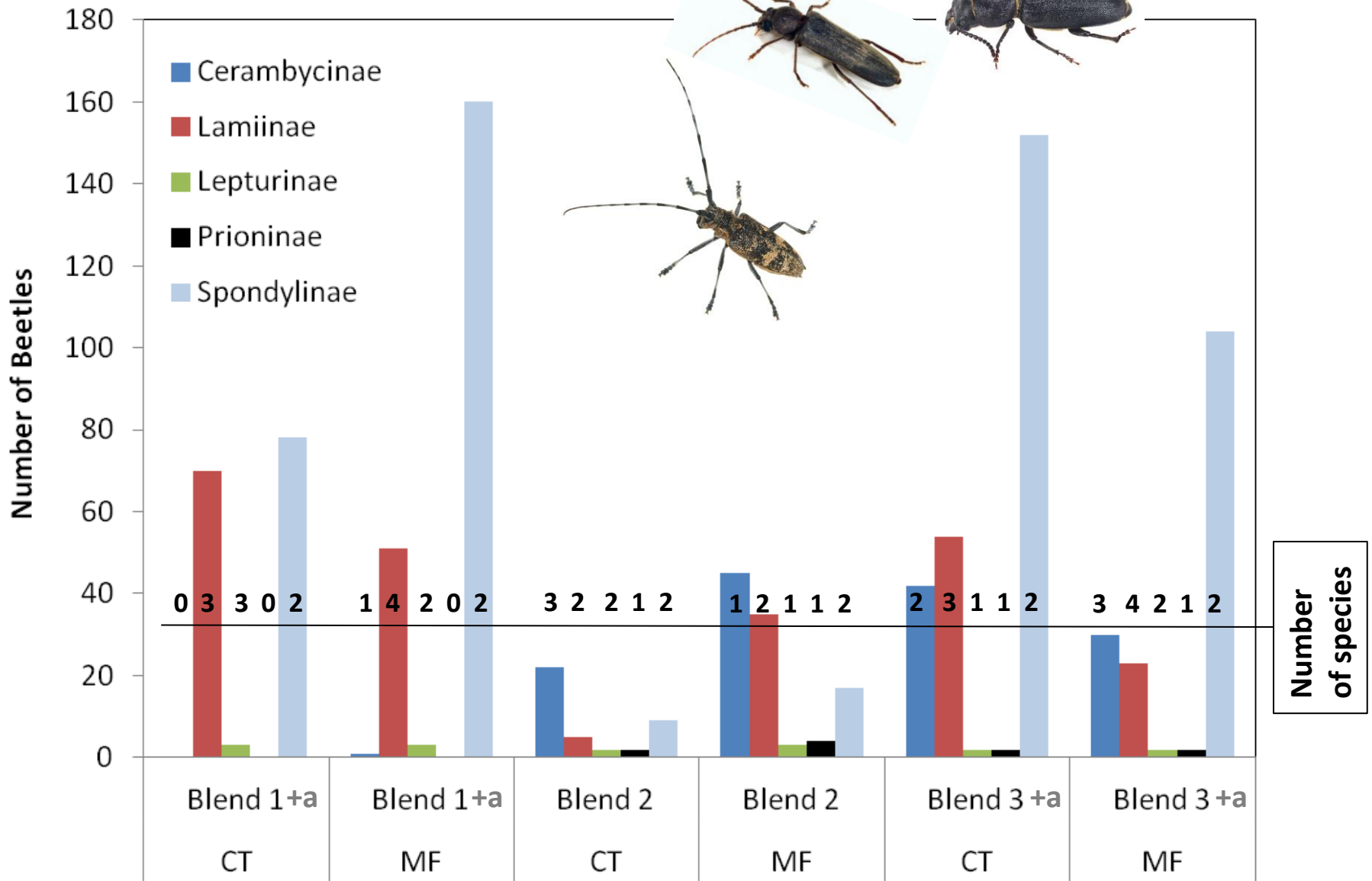
- Blends 1+a, 2, 3+a (2 traps per type and blend)
- Beginning of June to mid September

2018

- Blends 1+a, 2, 3, 3+a (2 traps per type and blend)
- 16 May to 10 Oct

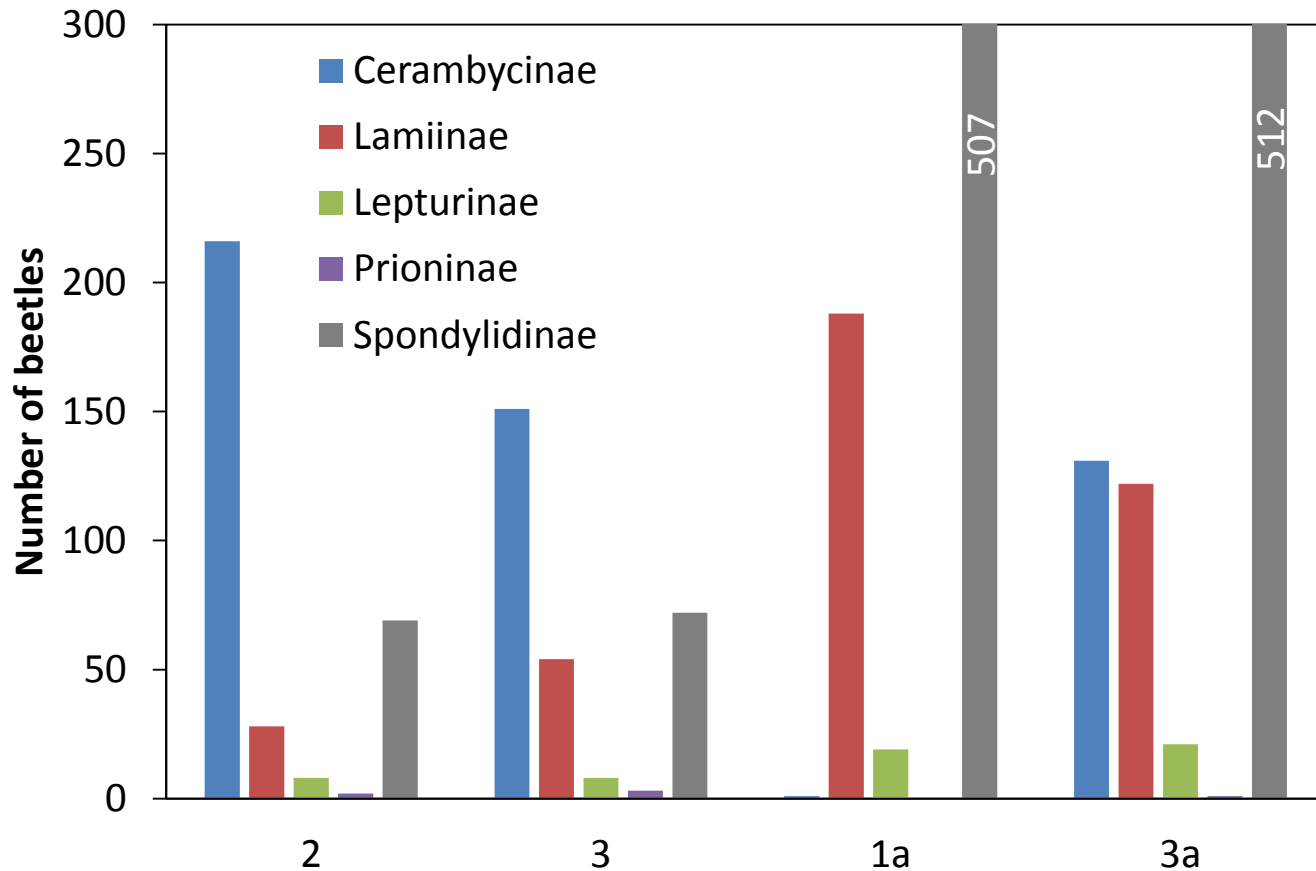


Neunkirchen – Pine forest, 2017



Number of specimens from different subfamilies caught in different blends in cross vane (CT) and multi funnel (MF) traps

Neunkirchen – Pine forest, 2018



Number of species: 2 4 3 1 2 3 6 5 1 2 1 6 4 0 2 4 7 4 1 2 (Total: 21)
 12 17 13 18

2113 individuals
 21 species

Number of specimens from different subfamilies caught in different blends in Austrian pine forest (trap types combined)

Specificity of Lures 1 and 2 for Lamiinae and Cerambycidae, respectively:

- Lure 1+a: only 1 specimen (*Phymatodes testaceus*) in out of 140 Cerambycidae in 2017, and 1 specimen (*Clytus lama*) out of 499 in 2018
 - Preference of Lamiinae for Lure 1+a
 - Specific response of *Prionus coriarius* to prionic acid (but low no.)
- (Results from pine forest Neunkirchen)

EtOH + alpha pinene leads to higher catch (Lure 3 vs. 3a):

- Vienna (port + forest) 140 vs. 236 specimens
- Neunkirchen 288 vs. 787, mostly due to Spondylidinae and *Monochamus*

Combination of lures 1 + 2 (= 3) + a is promising for multitrapping



Conclusions from MULTITRAP



Potential benefits from replacing single-lure trapping programmes with combined multi-lure programmes for early detection: Trap density can be increased (compared to single-lure trapping) for better early detection

Not only regulated pest species arrive at ports of entry

Many specimens have to be identified

Additional use of method in faunistic studies (two years trapping in Vienna: half of cerambycid fauna of this area)



Project: MULTITRAP

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Thanks to project partners:

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Thank you for your attention

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Forest district Neunkirchen

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