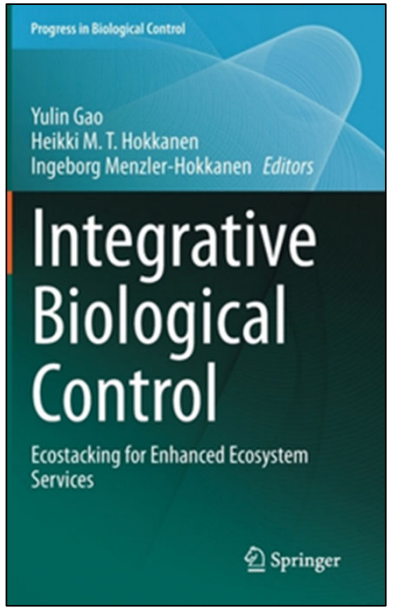
Keynote Address: “Revitalizing IPM New Ideas for the Future”

Dr. Ingeborg Menzler-Hokkanen

Professor Heikki Hokkanen, President XXVI International Congress of Entomology



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Revitalizing IPM - New Ideas for the Future

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UNIVERSITY OF EASTERN FINLAND

Aasatek
Embracing Nature

UEF Kuopio campus

ipm 2022

10th International IPM Symposium, Denver, Colorado

IPM
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IPM focuses on the PEST (management)

Broadening the focus to include more trophic groups in IPM results in adding “P”s to the acronym: + pollinators + predators + parasitoids + pathogens + parasitic plants

This highlights the **limitations of pest-centric IPM definitions**

Deguine et al. 2021,
Agron. Sust. Dev. 41:38

IPM

Arthropod-Plant Interactions (2015) 9:543–545
DOI 10.1007/s11829-015-9403-y

EDITORIAL

Integrated pest management at the crossroads: Science, politics, or business (as usual)?

Heikki M. T. Hokkanen[1]

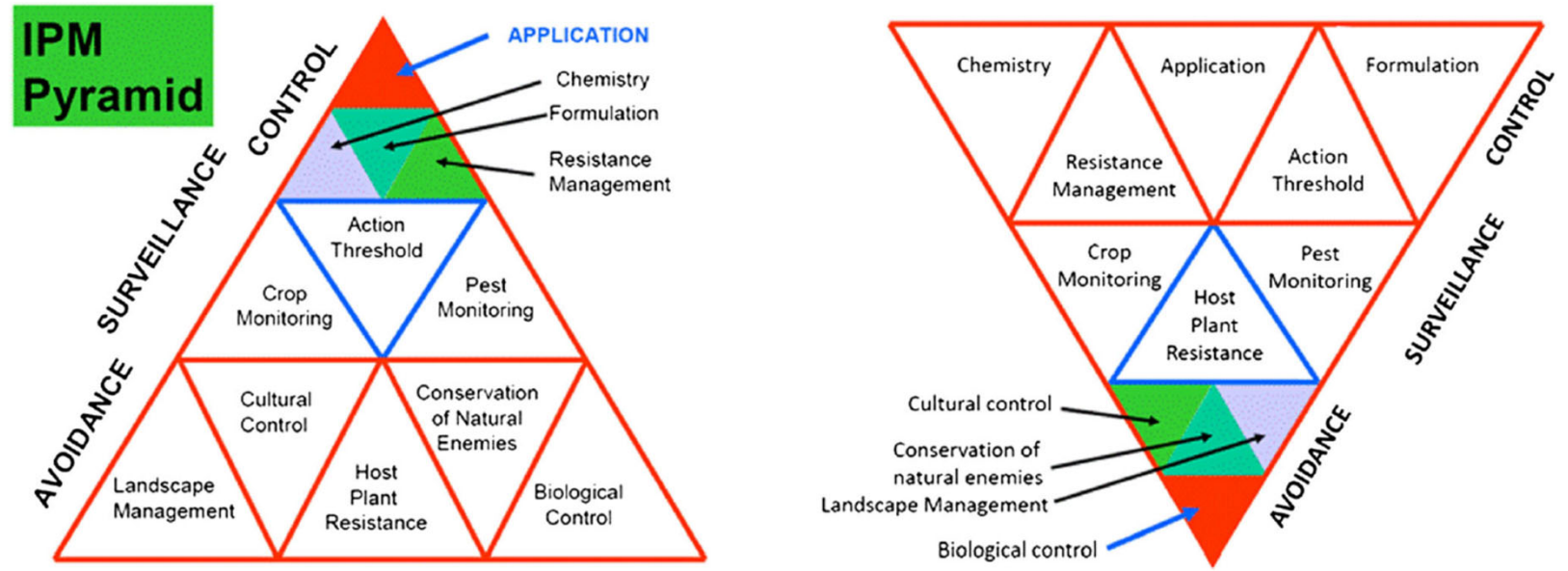
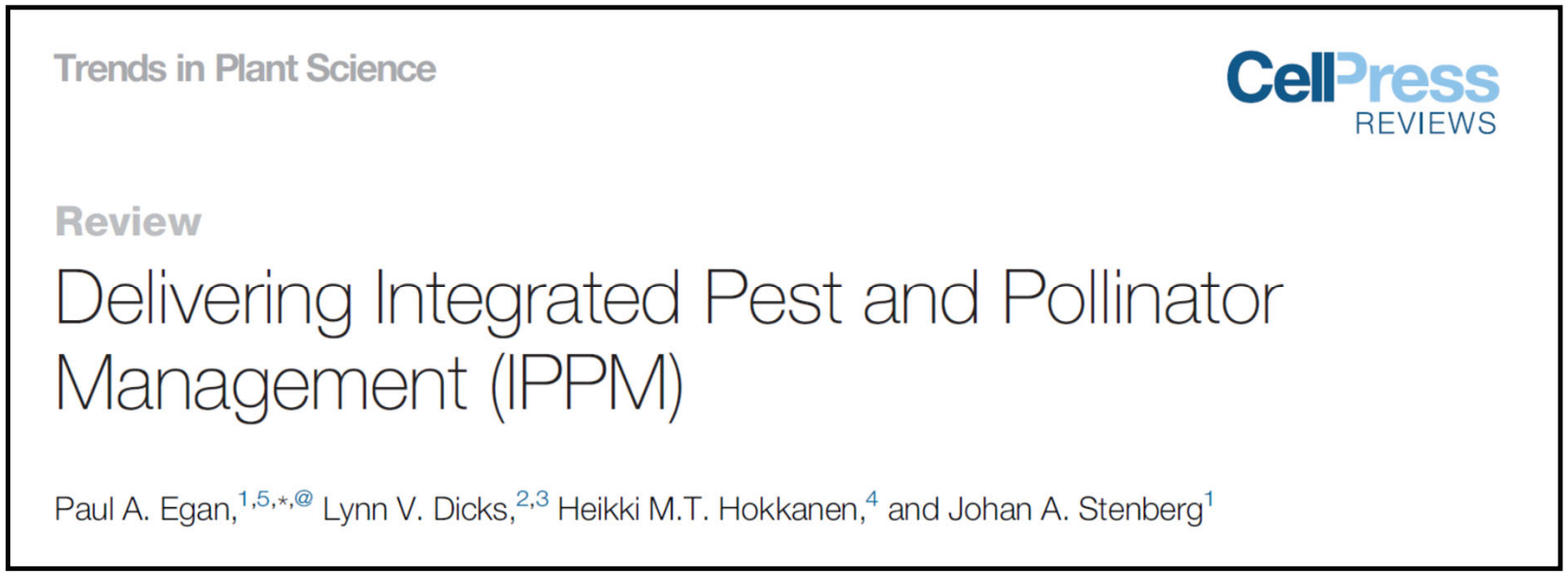


Fig. 1 The "reality gap" in pest management: ideal IPM as promoted for >50 years (*left*), and current reality in mainstream pest management (*right*)

IPPM: Integrated Pest & Pollinator Management

Basis for the approach: IPM does not explicitly favor pollinators, therefore all IPM measures need to be adjusted to ensure optimal pest management AND adequate pollination of crops.

Originally proposed by David J Biddinger & Edwin G Rajotte (2015), Penn State University

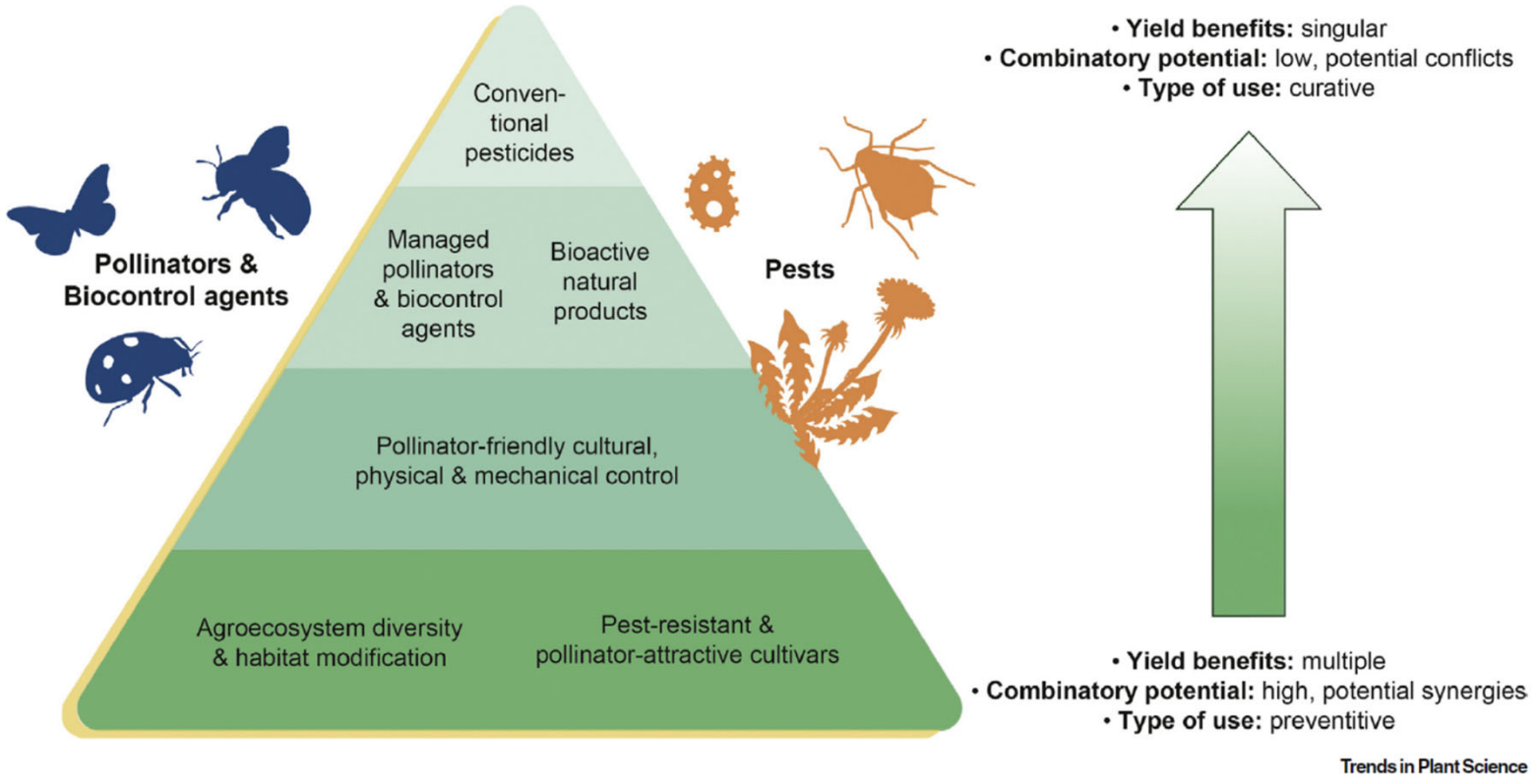


https://doi.org/10.1016/j.tplants.2020.01.006

Trends in Plant Science, Volume 25, Issue 6, 2020, Pages 577-589

Key Figure

Systematic Framework for Integrated Pest and Pollinator Management (IPPM)



Egan et al. 2020

Focus on ECOLOGY in crop protection => Agroecological Crop Protection ACP

application of agroecology to crop protection

Agronomy for Sustainable Development (2021) 41: 38
https://doi.org/10.1007/s13593-021-00689-w

REVIEW ARTICLE

Integrated pest management: good intentions, hard realities. A review

Jean-Philippe Deguine[1] · Jean-Noël Aubertot[2] · Rica Joy Flor[3] · Françoise Lescourret[4] ·

Transition from IPM to ACP (Deguine et al. 2021)

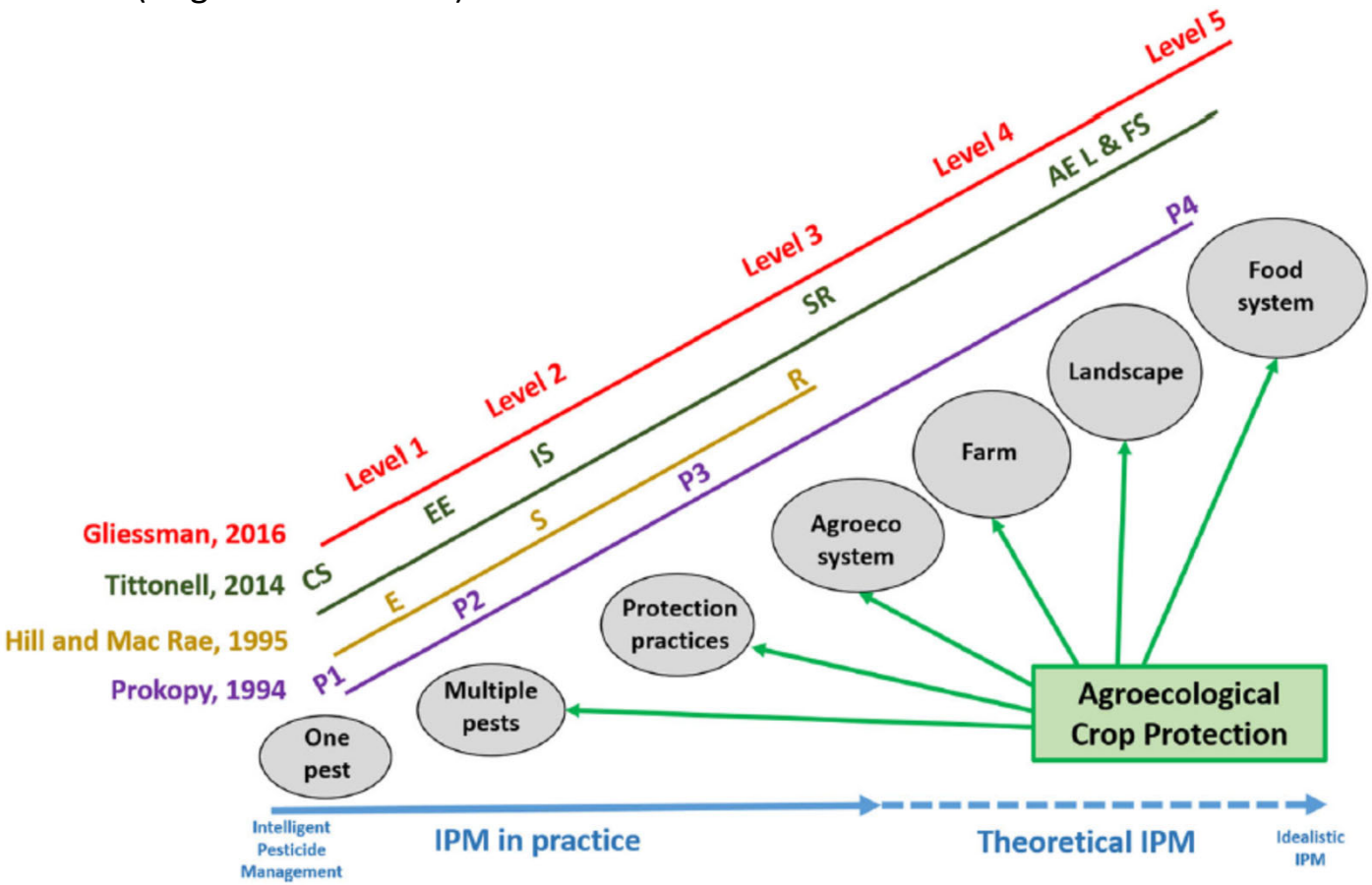


Fig. 12 From Integrated Pest Management (IPM) to Agroecological Crop Protection (ACP). Transition between agrochemical pest management and healthy agroecosystem & food system management.

Ecostacking

Arthropod-Plant Interactions (2017) 11:741–742
DOI 10.1007/s11829-017-9575-8

EDITORIAL

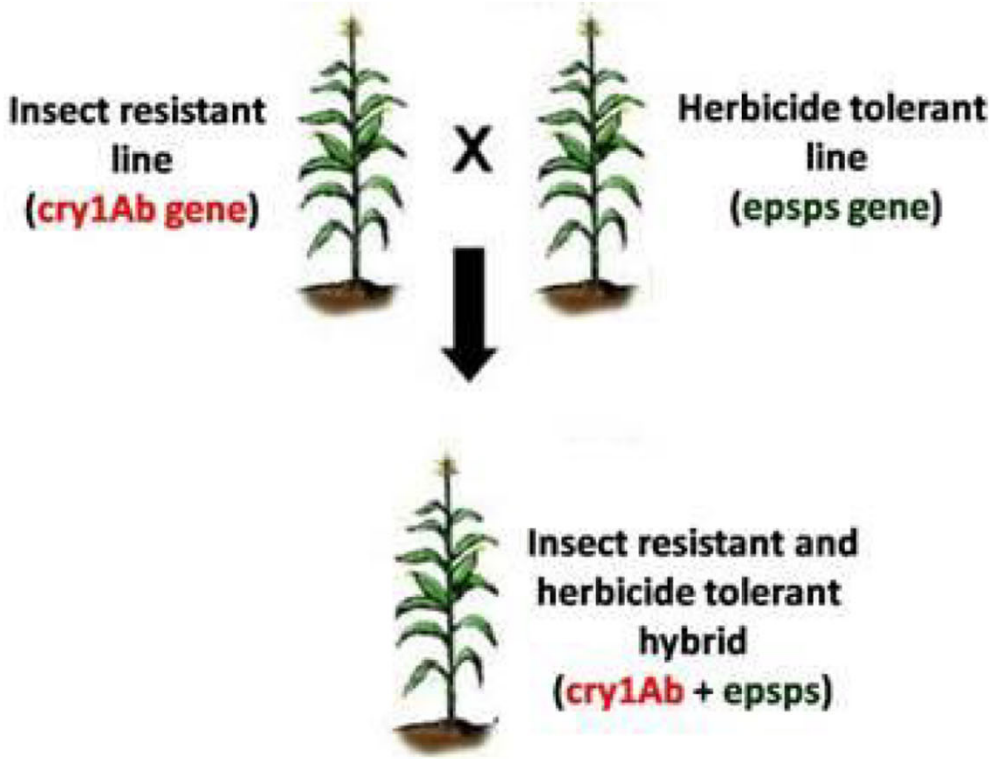
Ecostacking: maximising the benefits of ecosystem services

Heikki MT Hokkanen[1]

Wednesday 3:00–4:30 PM S32. Ecostacking as an Approach to IPM | *Governor's Square 14*

The concept of stacking traits

Gene stacking refers to the process of combining two or more genes of interest into a single plant. Gene pyramiding and multigene transfer are other monikers in the scientific literature referring to the same process. The combined traits resulting from this process are called stacked traits.



Common gene stacking methods used in the production of biotech stacks.

ISAA 2017: Stacked Traits in Biotech Crops

Stacking of beneficial ecological traits into one holistic system: ECOSTACKING

The beneficial effects from **all levels of functional biodiversity** (genes to landscapes) have so far not been systematically exploited in an **additive or synergistic manner** in one single system to provide the best possible level of pest control obtainable in a given environment.

Therefore we proposed (2017) to make full use of the pest control services accruable by stacking and conserving functional biodiversity in our cropping systems – by "ecostacking". Various types of ecosystem services need to be included and stacked: biocontrol, pollination, decomposition, etc.

Stacking implies combining the ecosystem services based on functional biodiversity from all levels and types. The various ecosystem service providers must be fully integrated with the rest of the cropping system, including agronomic practices.

Conclusions from literature reviews:

- **crop genetic diversity** can make a large difference for biocontrol efficacy
- **below-ground microbial functional diversity** can make a large difference for biocontrol efficacy
- **within-field botanical diversity** can make a large difference for biocontrol efficacy
- **Landscape level diversity** can make a large difference for biocontrol efficacy

Book series “CABI Ecostacking Series”

Established in November 2021

Two books under preparation:

- The Concept of Ecostacking: Techniques and Applications
- Entomovectoring: Using Insects to Deliver Beneficial Organisms, Substances and Devices

Springer

22 volumes published in the PIBC series, e.g., **Integrative Biological Control**: Ecostacking for Enhanced Ecosystem Services (2020); Gao, Hokkanen & Menzler-Hokkanen

XXVI International Congress of Entomology

HELSINKI, FINLAND, JULY 17–22, 2022