

Bees and Trees

Tradition meets restoration



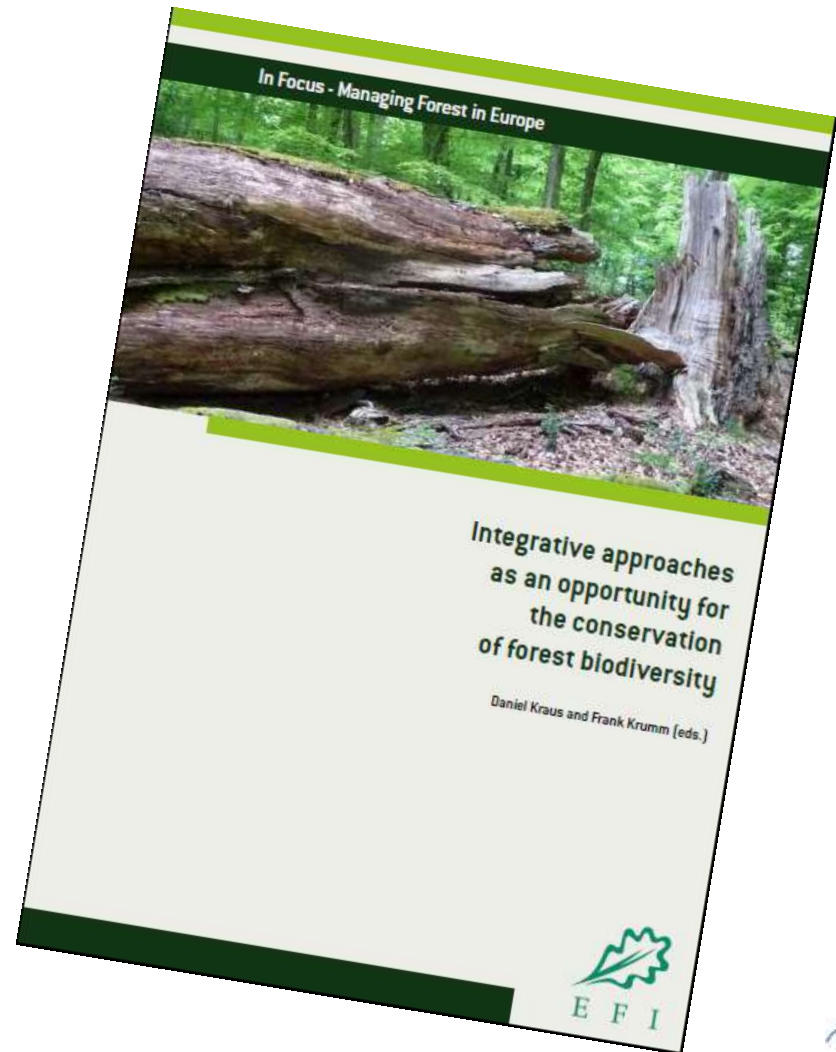
Frank Krumm

02.08.2016

www.integrateplus.org

Catalogue of tree microhabitats

Reference field list



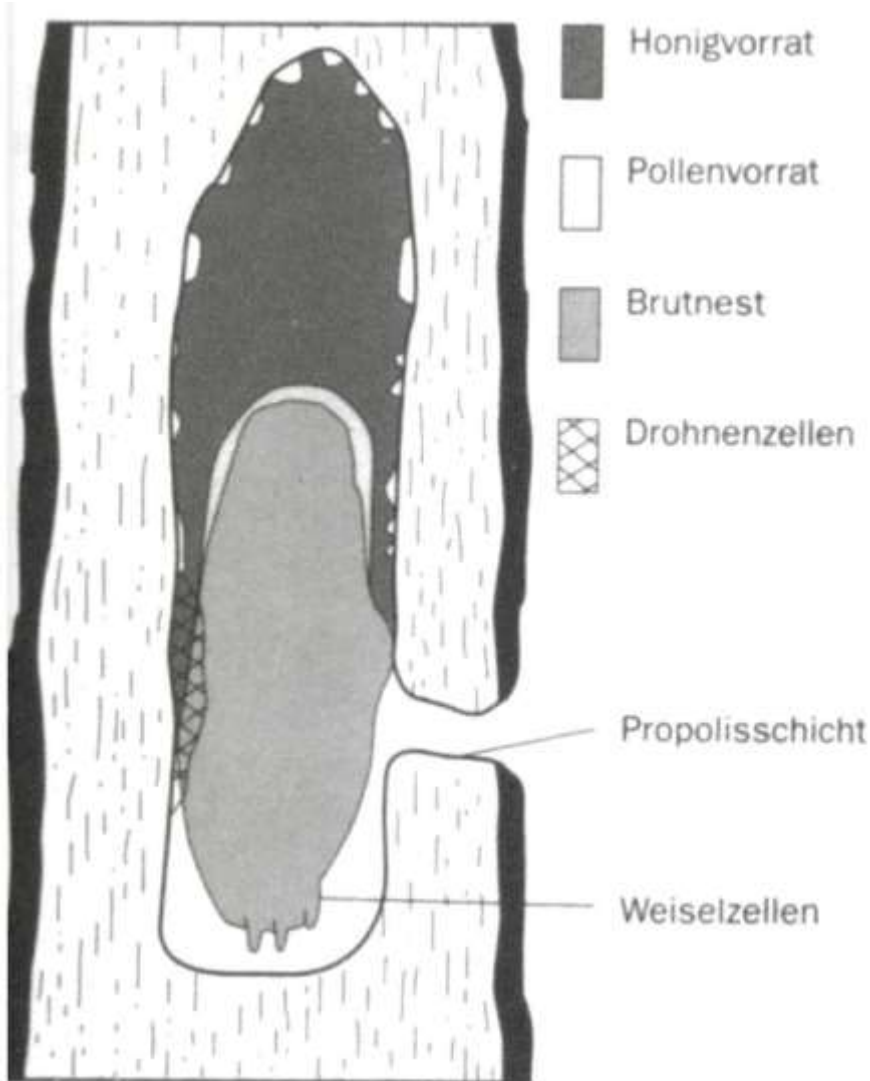
Why bees?



Apis mellifera mellifera is
a forest animal

Why bees and trees?

(according to Seeley 1997)



Natural „bee flats“ are cavity or cavity – like structures (trees, rock formations...)

Dinarda dentata



Lomechusa strumosa

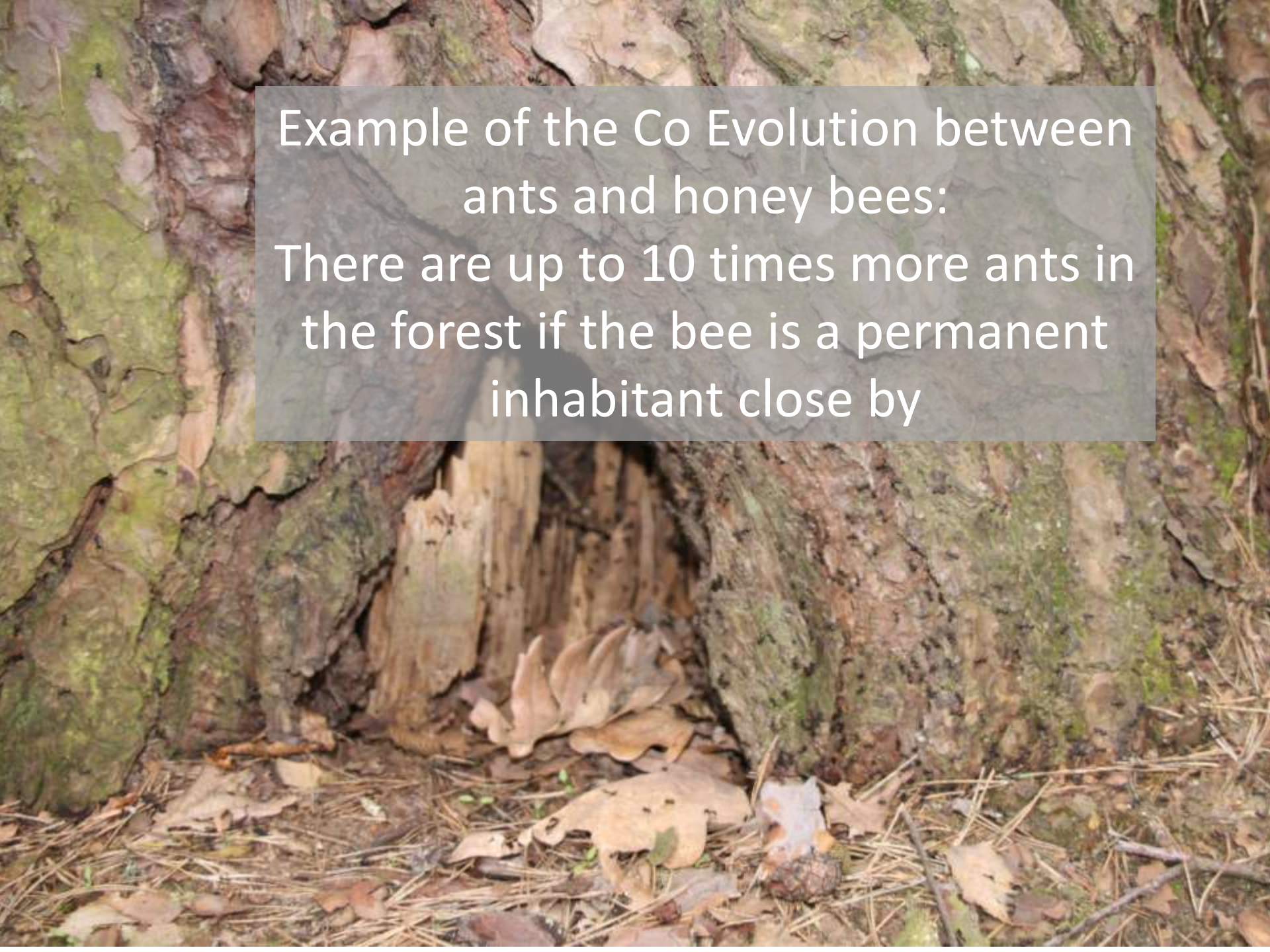


Many more symbionts, destruent and antagonists

Claviger testaceus



Amphotis marginata



Example of the Co Evolution between
ants and honey bees:
There are up to 10 times more ants in
the forest if the bee is a permanent
inhabitant close by



Journal of Toxicology and Environmental Health, Part A: Current Issues

Publication details, including instructions for authors and subscription information:
<http://www.tandfonline.com/loi/uteh20>

Fungicide Contamination Reduces Beneficial Fungi in Bee Bread Based on an Area-Wide Field Study in Honey Bee, *Apis mellifera*, Colonies

Jay A. Yoder^a, Andrew J. Jajack^a, Andrew E. Rosselot^a, Terrance J. Smith^a, Mary Clare Yerke^a & Diana Sammartaro^b

^a Department of Biology, Wittenberg University, Springfield, Ohio, USA

^b Carl Hayden Honey Bee Research Center, U.S. Department of Agriculture, Agricultural Research Service, Tucson, Arizona, USA

Published online: 16 Jul 2013.

THEY'RE ALL PART FUNGUS

Grass blades, coffee or cacao leaves ... probably all plants

BY SUSAN MILIUS

"You've mistaken a fungus for a pine tree" can be a ticklish thing for one botanist to say to another. Yet, in the 1990s, one respected university researcher made that very accusation to another. Stories such as this have spiced botanist gossip for years, but in this case, the two scientists resolved their differences and published a paper telling the whole story.

In the mid-1990s, Aaron Liston of Oregon State University in Corvallis was studying the evolutionary history of pine trees and managed to sequence a long stretch of DNA from pine needles. "It was still a big deal in those days," he says. He searched databases for genetic sequences from similar pine trees and found some that didn't match his results at all.

After more work, he became confident that his lab had the real pine-DNA sequence. He contacted Anna Klein of the University of New Hampshire in

Plant-entrusted fungi have been challenging to study, but modern molecular technology is finally revealing their world. Now, they're tuning up all over, and their influence can be big, even though they are not.

FUNGUS AMONG THEM Fungi can put the greenest human land developer to shame when it comes to turning open real estate into homes. Given just a few lucky breaks, some fungi exploit the vast acreage of leaf surfaces. Other fungal species target plant roots and show up routinely on some 85 percent of plant species. These mycorrhizal fungi can boost the root system's efficiency.

Fungal endophytes slip into plant leaves and stems to set up house-keeping between, or even inside, plant cells. Some fungal endophytes, such as those in tall fescue or other grasses, also infiltrate the seeds that their host plants are forming, thereby storing away for the ride to the next generation.

More commonly, endophyte spores waft through the air in search of a new home.

The spores are impressive at breaking and entering, says Elizabeth Arnold of the University of



SCIENCE NEWS

APRIL 15, 2006

VOL. 169 231



Proceedings of the National Academy of Sciences

www.pnas.org

⌂ (/) > Current Issue (/content/110/22.toc) > vol. 110 no. 22

> Wenfu Mao, 8842–8846, doi: 10.1073/pnas.1303884110



Honey constituents up-regulate detoxification and immunity genes in the western honey bee *Apis mellifera*

Wenfu Mao (/search?author1=Wenfu+Mao&sortspec=date&submit=Submit)^a,

Mary A. Schuler (/search?author1=Mary+A.+Schuler&sortspec=date&submit=Submit)^b, and

May R. Berenbaum (/search?author1=May+R.+Berenbaum&sortspec=date&submit=Submit)^{a,1}

P-coumaric acid up-regulates genes coding for cytochrome p450
("CYP") detoxification enzyme pathways.

Bees have 47 CYP genes - whereas most insects have 80.



Exp Appl Acarol (2006) 40:249–258
DOI 10.1007/s10493-006-9033-2

Efficacy of strips coated with *Metarhizium anisopliae* for control of *Varroa destructor* (Acari: Varroidae) in honey bee colonies in Texas and Florida

Lambert H. B. Kanga · Walker A. Jones · Carlos Gracia

Exp Appl Acarol (2010) 52:327–342
DOI 10.1007/s10493-010-9369-5

Development of a user-friendly delivery method for the fungus *Metarhizium anisopliae* to control the ectoparasitic mite *Varroa destructor* in honey bee, *Apis mellifera*, colonies

Lambert H. B. Kanga · John Adamczyk · Joseph Patt · Carlos Gracia · John Cascino

RESEARCH



EVALUATION OF *Metarhizium anisopliae* var. *anisopliae* Qu-M845 ISOLATE TO CONTROL *Varroa destructor* (Acari: Varroidae) IN LABORATORY AND FIELD TRIALS

Marta Rodríguez¹, Marcos Gerding^{1*}, Andrés France¹, and Ricardo Ceballos²

Varroa destructor
a parasitic mite
vectoring viruses.


At >7% infestation,
bee hives collapse !

15:10 / 26:18

Forest development and species composition

Abundance of specific species

Yes	No	Quality?
X		?
	X	
X		



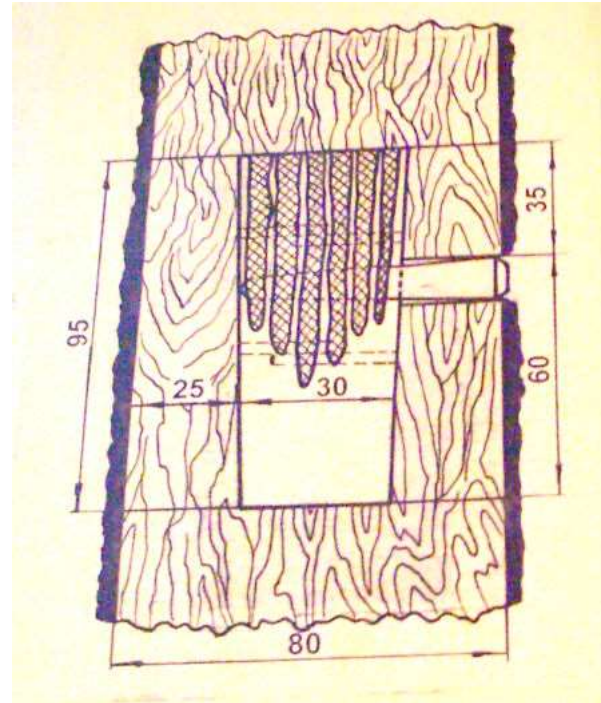
Stand initiation		Stand differentiation		Reproduction		Late development and stand break down	
Follows major disturbances (wind, fire, clearcuts). Stage ends when canopy becomes continuous and trees begin to compete with each other for light and canopy space.		Canopy is too dense to allow new saplings to grow into the canopy. Characterized by growth, competition and mortality produced spatial adjustments.		Characterised by larger and fewer trees, seed production, large crowns, larger canopy gaps, less aggressive crown expansion. More light reaching the forest floor.		Natural mortality of large overstory trees produces irregular canopy gaps and accelerates the recruitment of reproduction and subcanopy trees into the overstory and main canopy.	
Pioneer and Ruderal phase	Regeneration phase	Early	Late	Early maturity	Late maturity	Late development	Stand break down
Few pioneer trees, grasses, first perennials.	Regeneration of open space from seed, sprouts and advance regeneration. In managed forests: tree planting.	Competition is intense and density dependent self-thinning occurs.	Mortality rates are high, especially in the intermediate and suppressed crown classes, full utilization of growing space, possibility of stagnation.	Remaining trees may use resources to grow and reach their economic maturity. Small canopy gaps occur. In managed forests: potential conversion to a continuous forest cover system.	Gap dynamics, canopy gaps increase and young trees may establish naturally. This stage marks the transition of an even-aged to an uneven-aged stand.	Development of few trees to large, old and economically overmature individuals. Regeneration is already established.	Natural mortality of individual trees to complete break down of cohorts / stands. Potential overlap with stand initiation phase.
Herbivorous insects							
Pollinator insects							
Saprophytic/decomposer insects							
Predatory/parasitoid insects							
Lichens							
Vascular plants							



Zeideln –
reviving
a fascinating
tradition



Terminology



Tree hive – beute – *barć* - *bort*

Tree hive keeper – zeidler – *bartnik* - *bortnik*

Log hive – klotzbeute - *kłoda* -
koloda

(*barć* – *bort*, etc. – polish and russian)



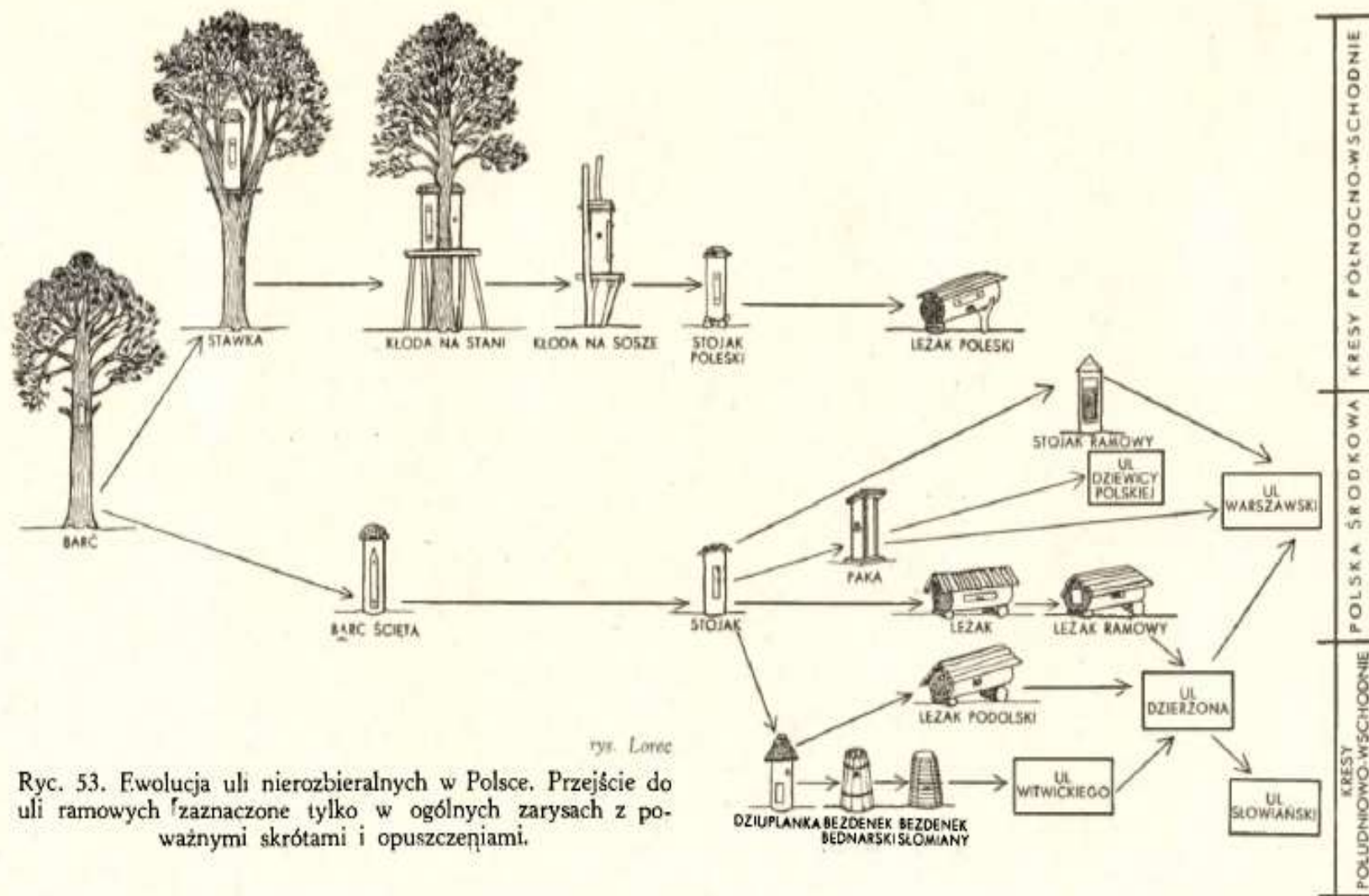
Looking back

- Oldest traces of „Zeidler“ from the 1. and 2. century – found in Germany



- In the 15/16. century Zeideln was an important craft, producing honey and wax
- Income derived from beekeeping was up to 30 times higher than from timber extraction!





Ryc. 53. Ewolucja uli nierozbieralnych w Polsce. Przejście do uli ramowych zaznaczone tylko w ogólnych zarysach z najważniejszymi skrótami i opuszczeniami.

Survival of tree beekeeping in Russia, Belarus and Ukraine



Legal situation (Germany, Switzerland....)



Feral honey bee

- Almost extinct (but not completely!)
- Due to selection of specific characteristics, bees are not adapted to their natural environment anymore
- Wild honeybees are often destroyed by the bee inspectors as they are considered to spread diseases
- Interbreeding between *Apis mellifera mellifera* and imported races such as Carnica, bukfast etc.

An aerial photograph showing a vast, patchwork landscape of agricultural fields and forests in Europe. The fields are arranged in a complex, irregular pattern of various shades of green and brown, separated by thin lines of roads or fences. The terrain appears to be hilly or mountainous, with the fields following the contours of the land. The overall impression is one of a highly managed and cultivated landscape.

80 – 90 % of the European
forests are actively managed

Elements of our landscape

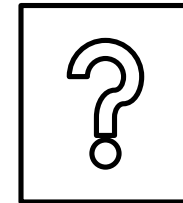


Forests and Bees




Forest management with
the main aim to produce
valuable timber

Forest as ecosystem



How
does it
work?



A photograph showing three individuals in full-body yellow protective suits, including hoods and gloves, working in a field of tall grass and green plants. One person is standing on the left, holding a long wooden pole. Two others are crouching in the center. To the right, a man in a pink polo shirt and white shorts stands with his hands in his pockets, looking towards the camera. The scene appears to be an outdoor field study or investigation.

There are specialists in all the various fields..... Less and less interaction between the different specific units – trend towards a segregative thinking.

The interaction should be improved

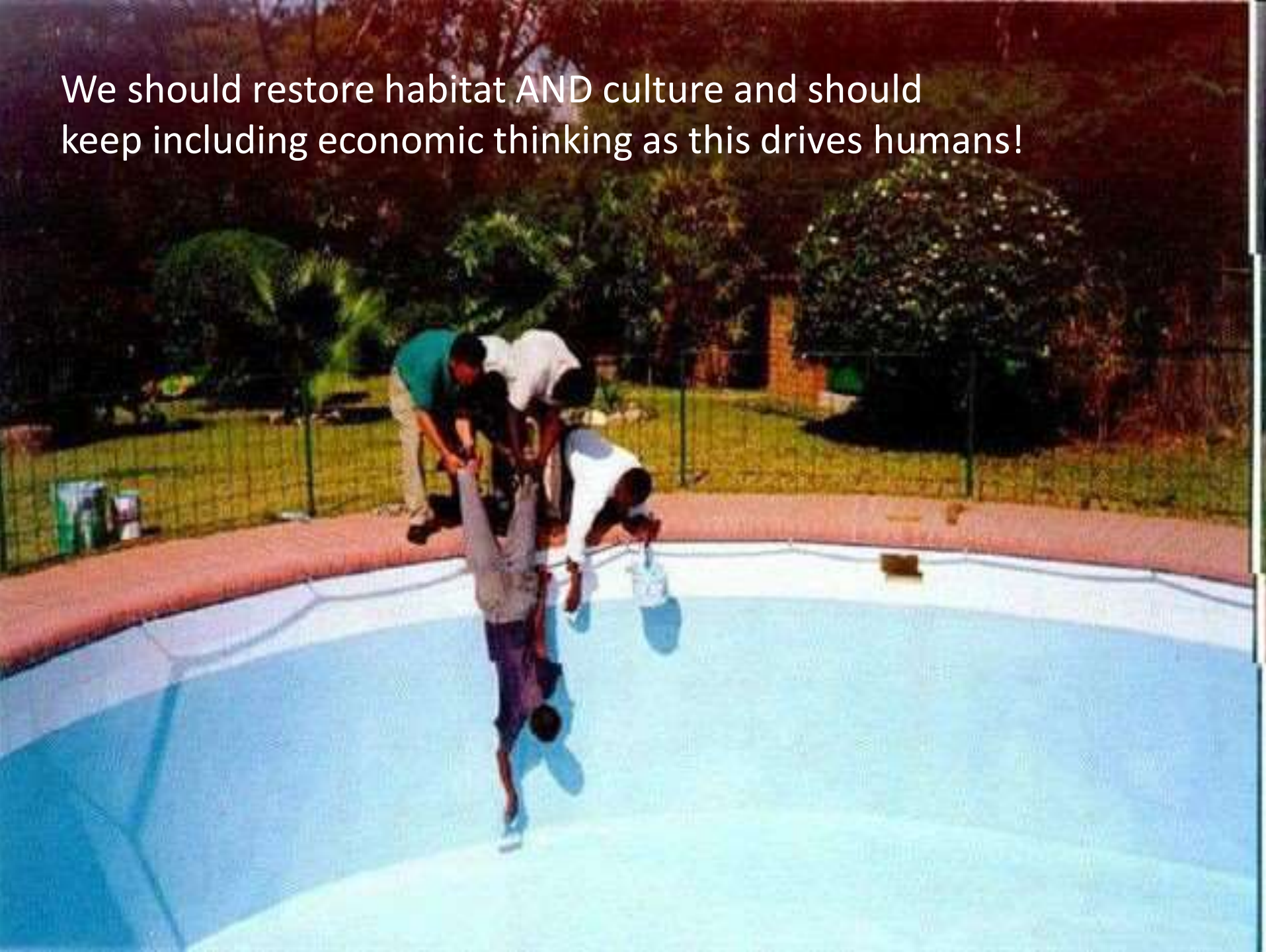


**Contradicting laws (National
forest acts, CBD, veterinary....)**

In October 2014 EFI has organised a course in Ebrach (Frankonia) with the result of 5 tree beehives and 8 log hives.



We should restore habitat AND culture and should keep including economic thinking as this drives humans!





www.tree-beekeeping.org

Thank you

19 2 2006

What is it about?

Naturlandschaft

Kulturlandschaft

Kulturerbe



Why should we think about tree beehives as a restoration measure?

The value of a bee colony according to Germanic justice (6. cent.)

Salische Gesetze: old Frankonian law (LEX SALIA)

Value of a bee colony: life of humans were evaluated with gold; The cheapest life of unfree foreigners was about 35 gold pieces; same as 1 trained goshawk, 1 tame red deer or 1 bee colony
(Source: BV 11/328/1912)



There is an economic value!





- One of the arguments to preserve biodiversity is to maintain capacity to react on changes.
- Forests provide more than timber

