Bees
- important pollinators
and producers of bioeconomic products.
Their importance and actual problems in Germany

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Bee pollination guaranties quantity and quality

Food choice without bees

(Whole Foods Market 2014, Folien: Goss

bees in Germany

- ~ 100 000 beekeepers, mainly hobbyists (98%)
- manage ~ 1 Mio honeybee colonies
  - no Africanized or stingless bees
  - Already lost: wild living honey bee population
  - Managed colonies distributed over the whole country
- few bumble bees species for pollination (glasshouse, tunnels)
- solitary bees (two osmia species) for certain orchards and house gardens

honeybees – bumble bees – solitary bees

What needs do they have?



~ 650 bee species (mainly unknown in the population)
~ 50% wild bees species endangered

108.214 beekeepers in Germany

- 90% organized in
- 2.500 local clubs
- 19 county associations
- 1 professional beekeeper association
- 1 German beekeeper association

(DIB, 2017)

hobbyists - professionals

- 90% hobby beekeeper (< 30 colonies)
- 10 % professional or profit oriented
- Largest German apiary 6.000 colonies (eco)

Gentle bees

Actual trends
2010 - 2016

- 31% more beekeepers
- 20% more colonies

(DIB, 2017)

Annual production of bee products in Germany

- 25.000 tons of honey (~ 10 varieties)
- 1.000 tons of beeswax
- Low production of pollen (private consumption)
- Marginal production of propolis and royal jelly

Characteristic:

Huge demand of honey, bees wax and pollen in the country. At least 75% of these products have to be imported.

Germany – a country of importation

- 80% of the consumed honey is imported
- 80 - 90% processed beeswax
- 99% royal jelly
- 60 - 70% raw propolis

(DIB, 2017)

Bee products and pollination

- Value of produced bee products (honey, beeswax, etc.): ~ 0,12 billions Euro.
- Value of pollinator dependent crops: ~1,6 billions Euro.
- Service for agriculture: 10-15 fold higher value in comparison to hive products.

(BMEL, 2014)

Bees – importatn pollinators in relevant crops

	honey bees	solitary bees	bumble bees	flies	syrphids	thrips
apple	O	O	O	O	O	O
pear	O	O	O	O	O	
cherry	O	O	O	O	O	
plums	O	O	O	O	O	
ripes	O	O	O	O		
rasp- blackberry	O	O	O	O	O	
blueberry	O	O	O	O		
cucumber	O	O	O	O		
pumpkin, zucchini	O	O	O			
green bean	O	O		O		
paprika	O	O	O	O	O	
tomato		O	O	O		
strawberry	O	O	O	O		
oilseed rape	O	O	O	O	O	
sunflower	O	O	O	O		
horsebean	O	O	O	O		

Colony distribution in the landscape

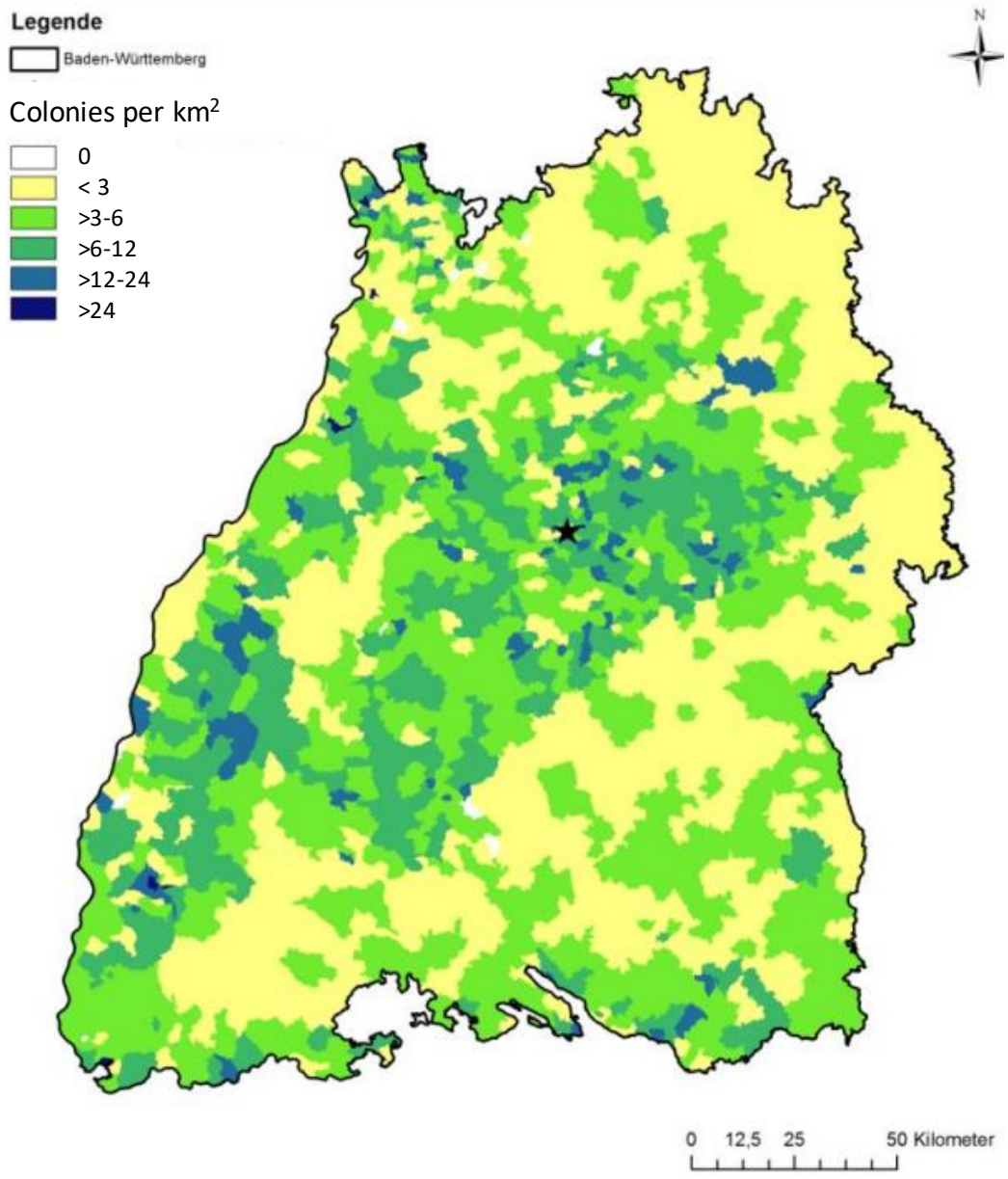
- increasing numbers of beekeepers and colonies in or near cities,
- decreasing numbers in agrarian landscape.

(BMEL, 2014)

Colony distribution and density

Baden-Württemberg

Colonies per km^2



(Dabbert, 2016)

Insufficient Pollination

- Apple: 4-10 colonies/ha (= 100-400 colonies/km^2)
- Strawberries: 3-4 colonies/ha

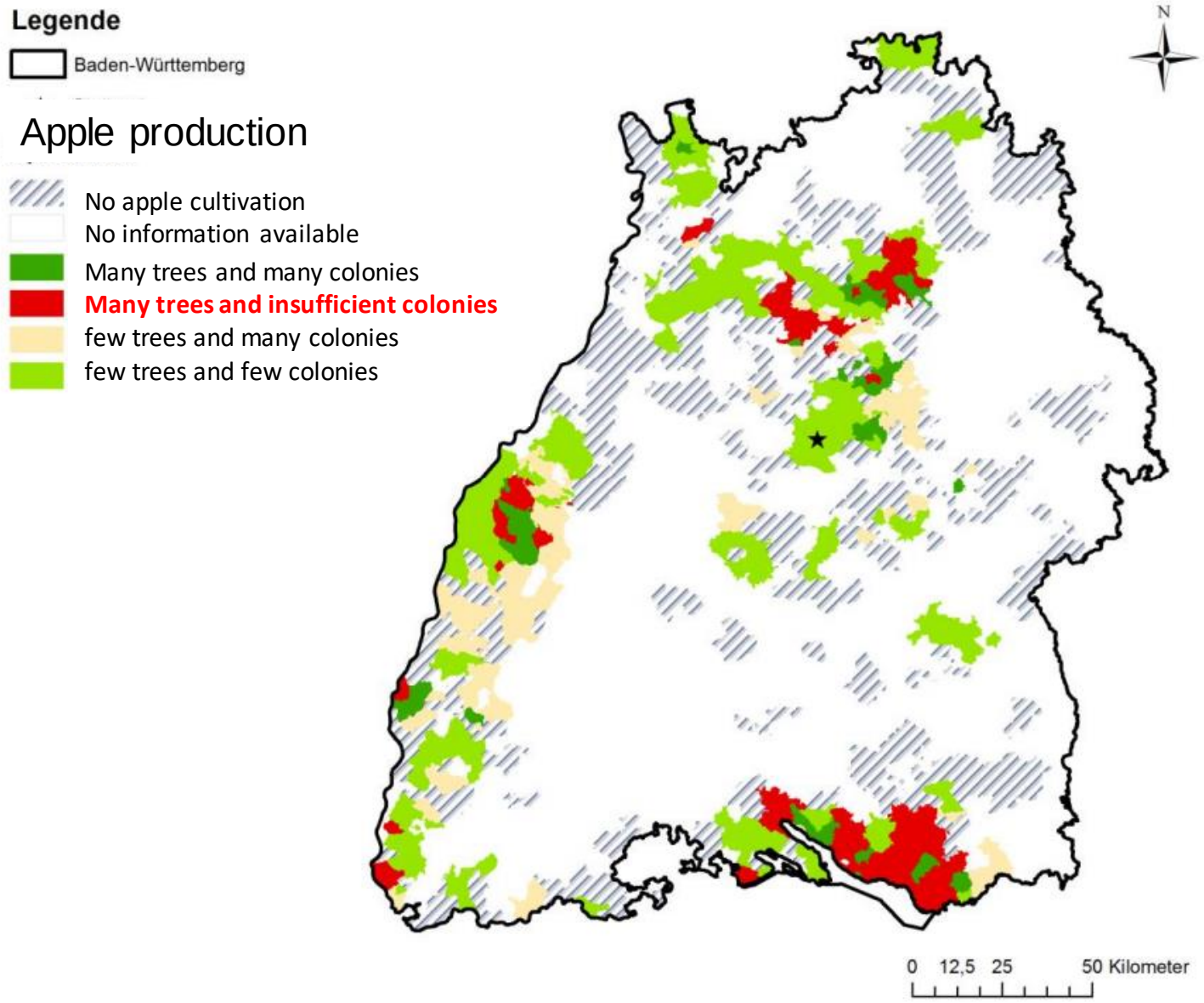
- ~ 16% regions with expected insufficient pollination (specialized cultivation, intensive vegetable gardening, large scale fruit cultivation

- Transport of colonies to this areas is necessary.

(Rau, 2009; Mandl, et al., 2011)

Apple production and colony density

(Dabbert, 2016)



Apple orchard with bee hives

Colony density and pollination

- the current beehive-density cannot guarantee a sufficient, spatially inclusive and comprehensive pollination.
- Especially large monocultures (oilseed rape) and intensive fruit and vegetable production regions are at risk of pollination deficiencies.
- Low density of wild bees in early spring.

(Frerick, 2017)

Value of beekeeping

- The beekeeping sector is of high economic importance, especially due to honeybee pollination services in pollinator dependent crop production.
- Honeybees are number 3 in the ranking of economical relevant animal species
- Yet uncalculated is the fact, that bees die equally distributed in the landscape
- 150 tons per day in Germany.

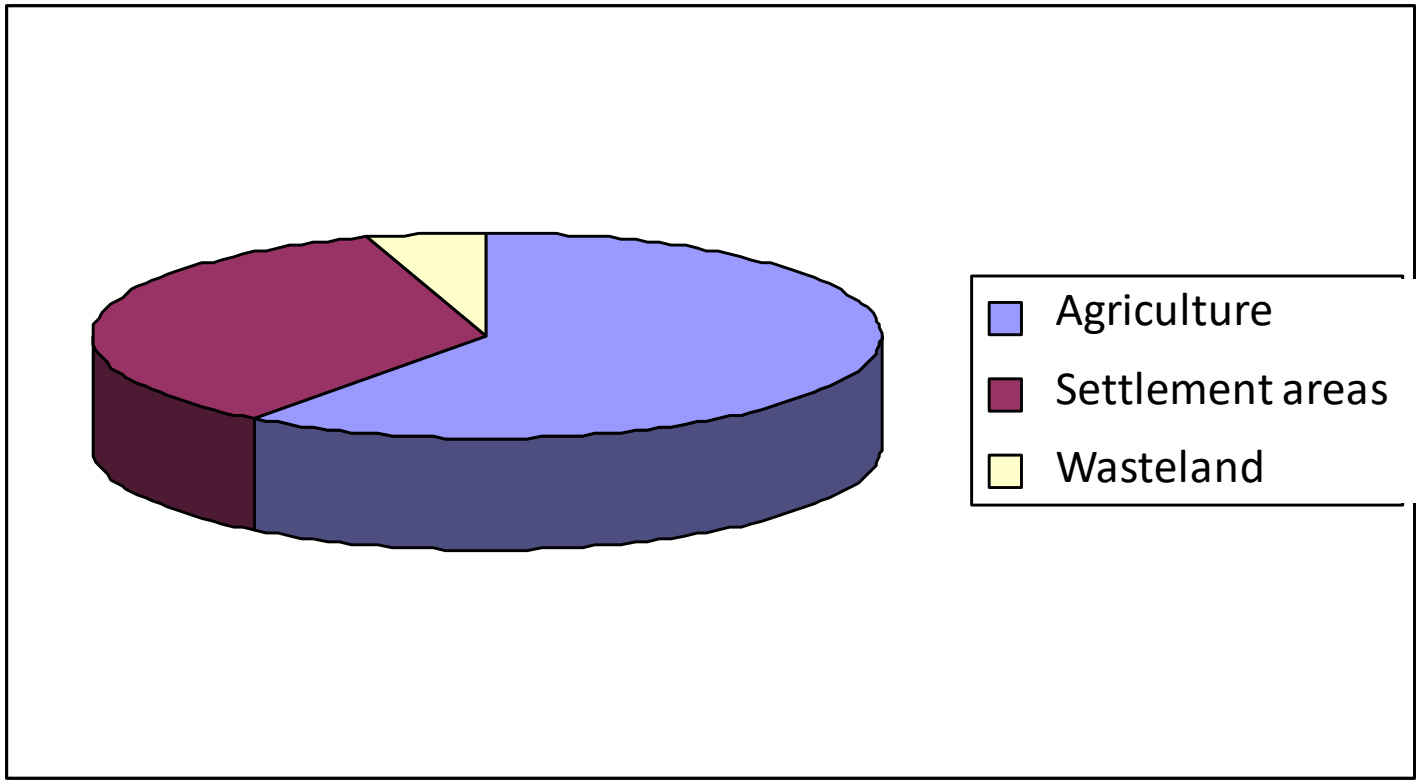
Crab spider catches a bee

Raising Problems

- Dramatic loss of flowering plant species
- In Agriculture
  - grassland
  - plant production
- In private land
- Increasing field size
- Flight distance to nectar and pollen sources becomes critical
- Chemicals in flowering mono cultivations (oilseed rape)

- Pressure on nutrition and habitat specialists

Strong Influence of settlement areas and agriculture on the habitat of pollinators



Bees try to survive in an environment completely influenced by humans

Intensification and specialization eliminates flowers

Monoculture in square kilometer size….


….free of bee plants

Grassland – milk production

silage suppresses and eliminates flowering plants

Silage – destruction of seeds

grass dominance triggered by intensification

lost plant diversity – lost bee diversity

Bee free landscape


Hay meadows – guarantor for species rich plant societies with longtime flowering

Private land use.
Flowering meadows disappear

…already during the flowering period of fruit trees

Which pollinators can we expect?

www.ggogle.com

Distinct diversity of flowering plants is the key for the diversity of pollinators

- Distance between nesting site and nectar/pollen source is essential.
- - limited flight capabilities for smaller bee species.
- Large scale grown crops (corn, cereals, potatoes, soya, sugarcane, sugar beets…are useless for most bee species and more a barrier.
- Insuperable distances and the loss of their specific plants and adequate nesting sites eliminates the base for survival.
- Their loss will interrupt the food chain to other species.

Thanks for your attention

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