Melliferous plants and modern beekeeping management

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Bee pasture

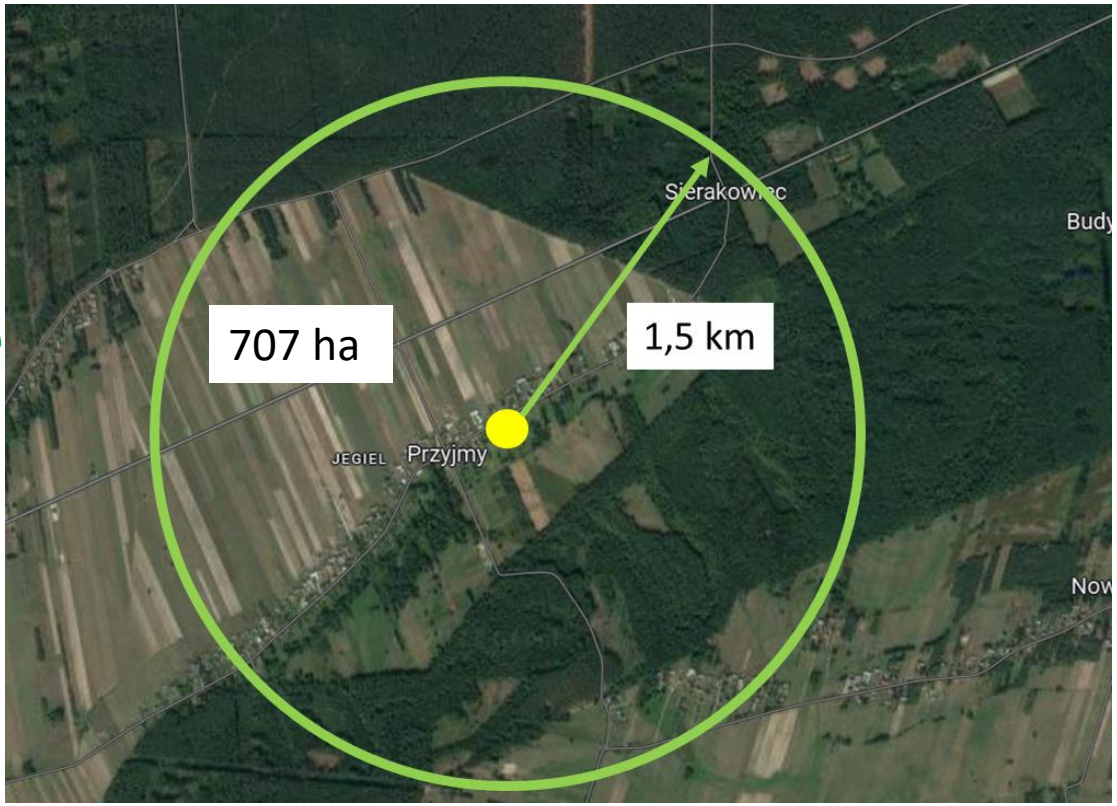
The area where the bees work

- radius up to 1.5 km

  effective flight distance of the honey bee
- radius up to 2 km

  less effective flights of bees
- radius 3 km

  maximum flight distance of bees



Products collected from plants by bees

Nectar

- sweet liquid secreted by flower nectaries
- nectar is a water solution of glucose, fructose and sucrose
- the nectar of black Locust (Robinia) is dominated by sucrose
- In buckwheat nectar contains only glucose and fructose

(glucose content accelerates the crystallization of honey)

The sugar content in nectages depends on the plant species.

The content may vary depending on the species from 5% to 70%.

Bees prefer to collect:

- nectar with a content of 50%
- content below 15% they collect reluctantly
- below 5 % they don’t collect.

Ripe honey contains less than 20-18 % water

Honey-dew

Honeydew is produced by aphids that feed on plant cell sap.

Cell sap contains large amounts of sugars that insects do not use.

Excess sugars secrete in the form of honeydew

Source of the honeydew

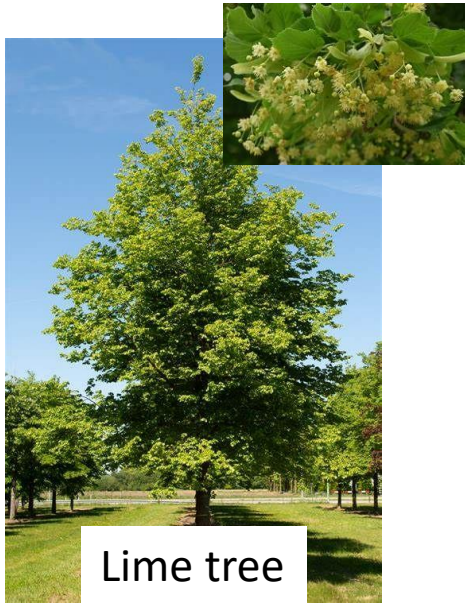
Coniferous trees


Fir


Spruce

deciduous trees


Willow tree


Lime tree


Maple tree

Monocotyledonous plants


Common reed


Rye

Bee colony's demand for honey during the year

honey used for own needs during the harvest period

January	1 kg
February,	1 kg
March,	3 kg
April	8 kg
May	15 kg
June	20 kg
July	15 kg
August	13 kg
September	8 kg
October	3 kg
November	2 kg
December	1 kg
During the year	89 – 100 kg

winter stock

Bee colony's demand for pollen during the year

January	--------
February,	0,5 kg
March,	1,5 kg
April	3,5 kg
May	7 kg
June	8 kg (and more)
July	5 kg
August	4 kg
September	1,5
October	--------
November	--------
December	--------
During the year	31 kg

honey used for own needs during the harvest period

winter stock

Conditions for the proper development of a bee colony

- sugar foods
- bee bred
- water
- heat

At least 2,5 (100%)frames of bees in March (on 4-5 frames in reality).

If the families are smaller, it is better to combine them.

They will bring more honey

Experiment

Effect of colony size at the beginning of the season on honey harvest

A family of 1 kg of bees - gave 7 kg of honey in the season (3 x 7= 21kg)

A family of 3 kg of bees - gave 49 kg of honey in the season

49 kg /21 kg = 2,33

Bees in a large colony **produced 2.33 times more** honey than in a small one

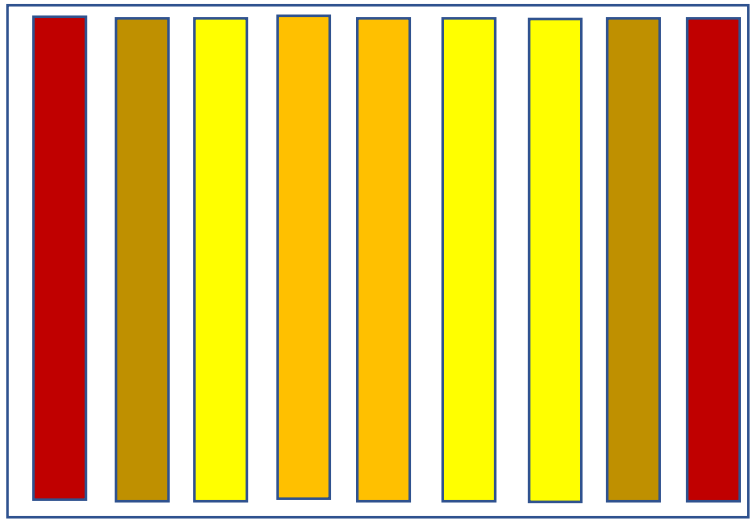
The first treatment after winter - Floor board cleaning

It is best to use a new floor board.

We take dead bees from the apiary (burn them best

We clean and disinfect the old flor board

Initial state - bees have been wintered on 7 frames



frames with honey

frames with broods

frames with bee bred

straw mats

Bees occupy only 3 frames completely

During the first quick check, we need to remove the excess frames

Which ones stay and which ones we remove?

We leave the frames occupied by bees and two additional ones

In the end, 5 frames remain

Frame importance hierarchy:

1. Frames with brood
2. Frames with bee bred
3. Frames with honey

Bee drinker bowl - start in early spring in March

- Bees need water to dilute honey and bee bread.
- This is especially important in early spring.

(the water in the drinker should be warm)

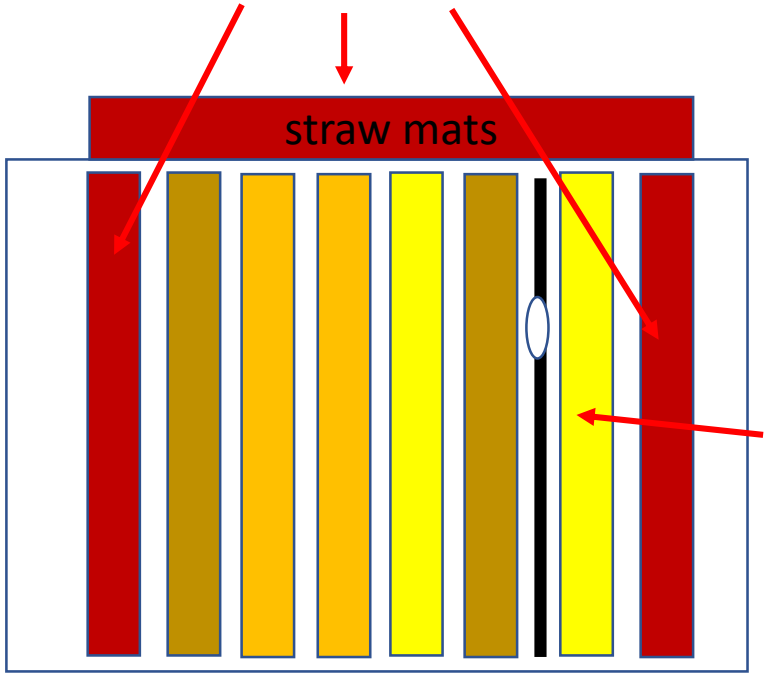
<u>Bees shouldn’t drown in the drinker bowl</u>

board on which water flows

elements floating on the surface of the water

State after the first inspection – after the first flight in March (temperature above 10°C)

The entire nest is well insulated



First, we take out the frames with the smallest amount of honey, or completely empty

If there is no space in the nest for another frame with honey, we insert it uncapped behind a wooden wall.

The bees will move the food from the frame to the nest.

In the hive must remain 0,8 kg of honey per 1 frame

thin wooden wall with a hole in 1/3 of the height

Systematically controls the amount of food in the family

frames with honey

frames with broods

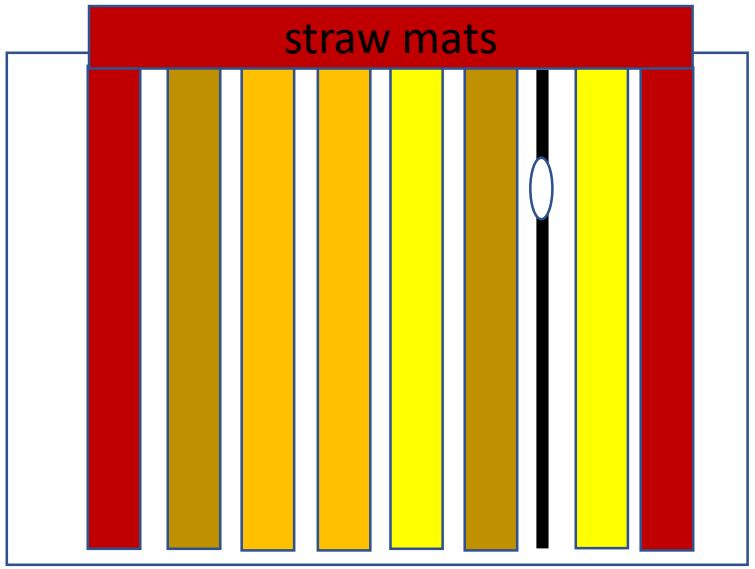
frames with bee bred

straw mats

We may add frames, but not earlier than in 3 weeks

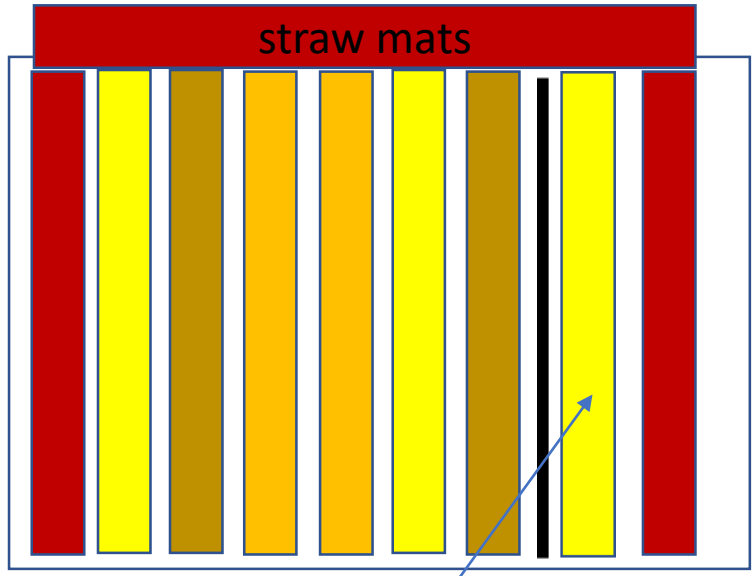
With the next review, we are waiting for the first warm days with temperatures above 15 **°C.**

Another possible hive inspection - April



We add one frame with food
or an empty rebuilt one

The entire nest is still well insulated



We keep an eye on the food 0.8 kg per 1 frame

If we don't have frames with food, we can use
a honey-sugar cake

thin wooden wall with a hole in 1/3 of the height

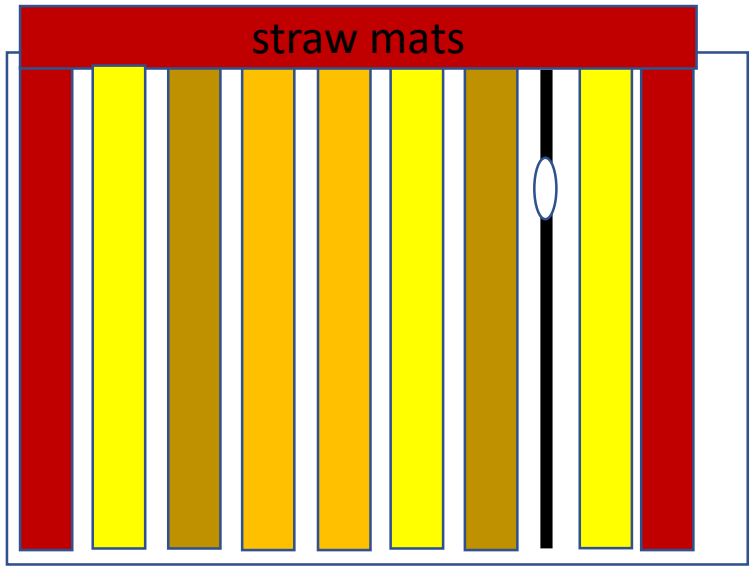
frames with honey

frames with broods

frames with bee bred

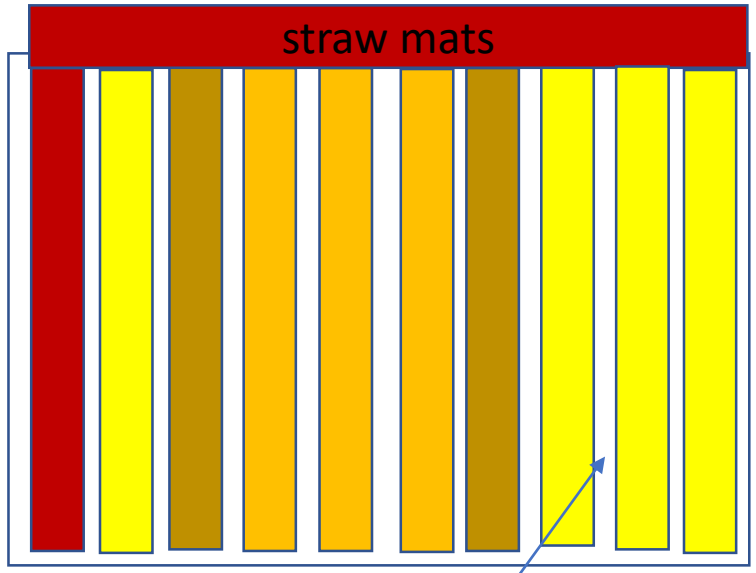
straw mats

Another possible hive inspection – second half of April



We add one frame with food or an empty rebuilt one

The entire nest is still well insulated



There are more and more bees, we add more frames depending on the needs. We still remember about food supply and access to water.

thin wooden wall with a hole in 1/3 of the height

frames with honey

frames with broods

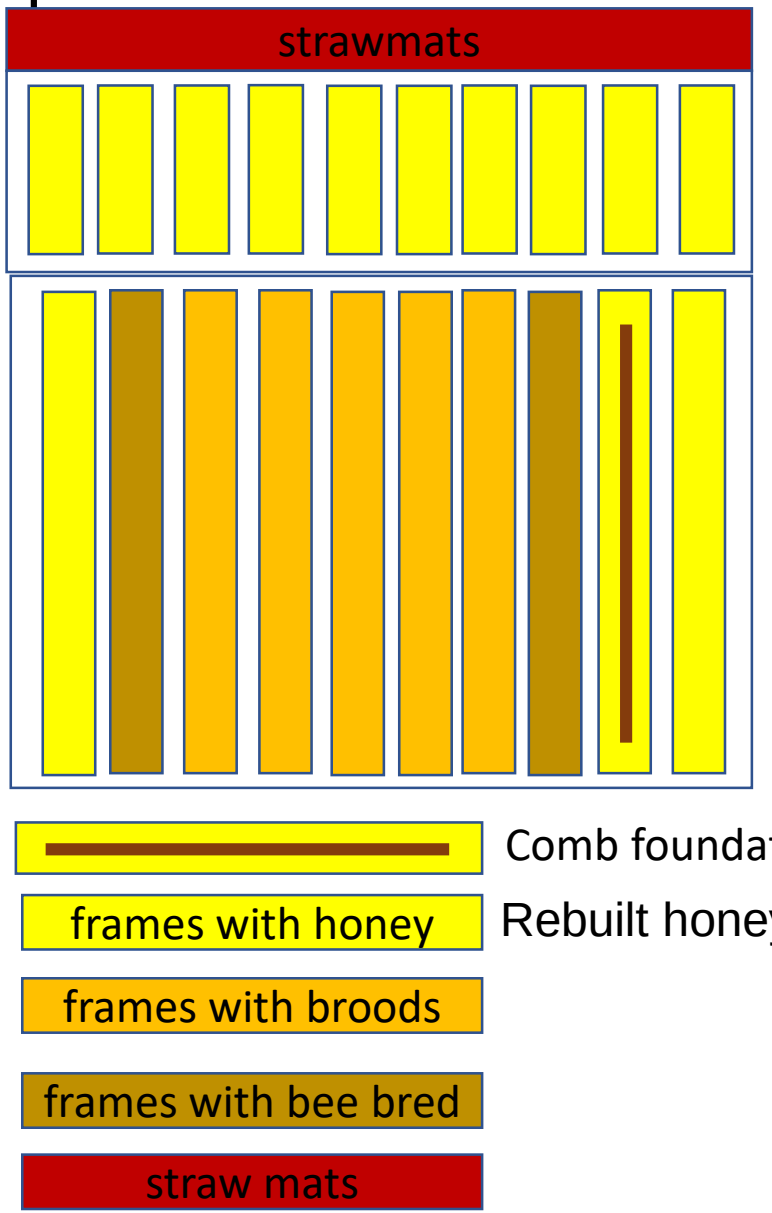
frames with bee bred

straw mats

Drinker bowls, or in jars directly to the hive

Beginning of May - rapes begins to bloom. Time for the first honey super

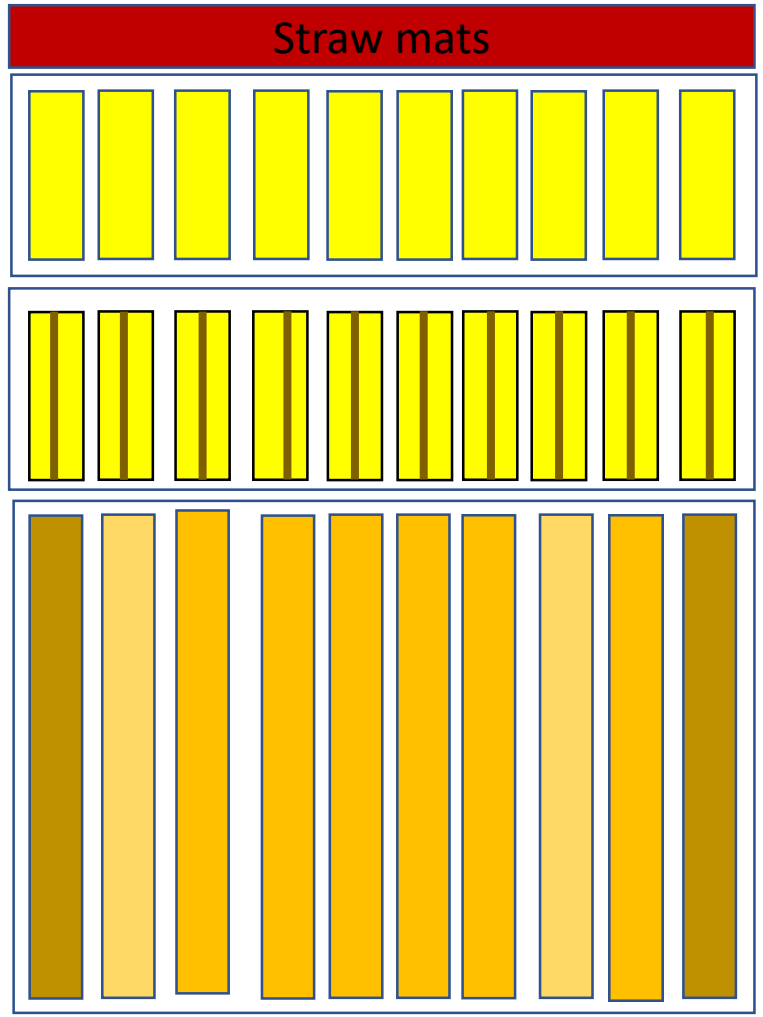
Rapeseed blooms up to 3 weeks



After one week of rapeseed flowering
Time for the second honey super

Comb foundation

We are constantly taking care **of a place for the growing number of bees** and controlling **the swarming mood**



Comb foundation

frames with honey

Rebuilt honeycomb

frames with broods

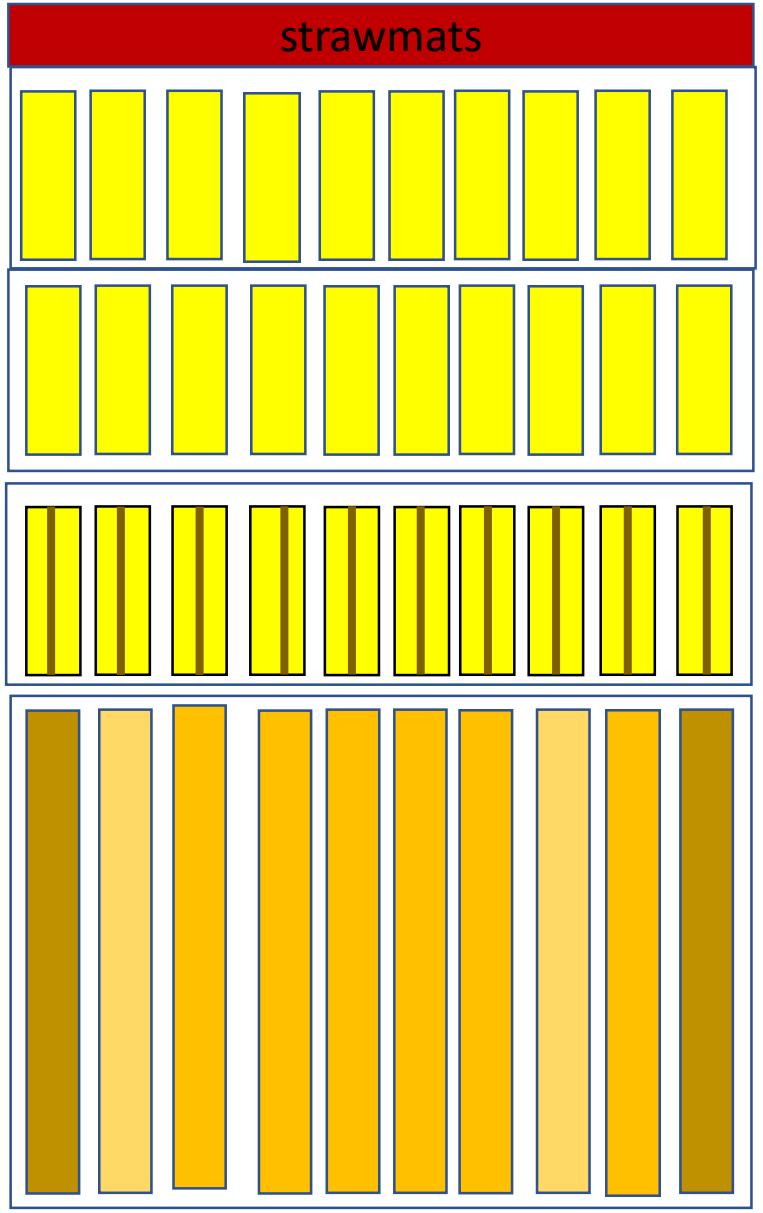
frames with bee bred

straw mats

After two weeks of rapeseed flowering
Time for the next honey super

Honey super with honey

We are constantly taking care **of a place for the growing number of bees** and controlling **the swarming mood**



Comb foundation

frames with honey

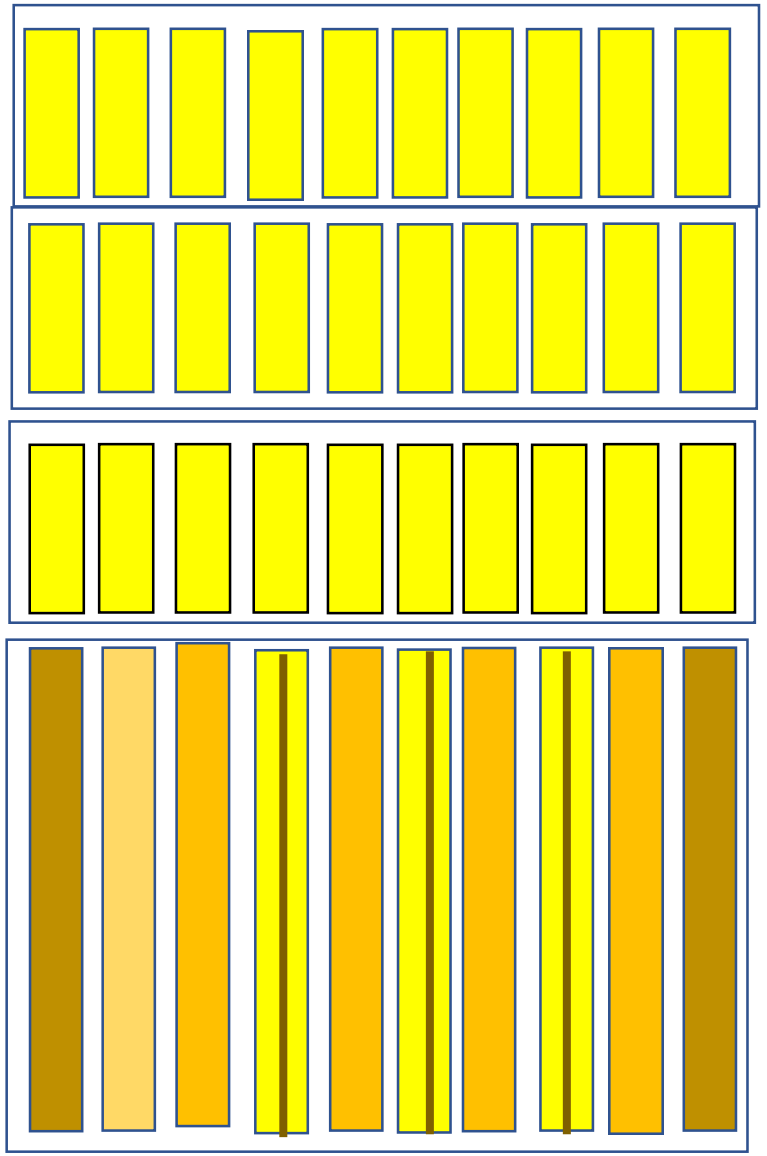
Rebuilt honeycomb

frames with broods

frames with bee bred

straw mats

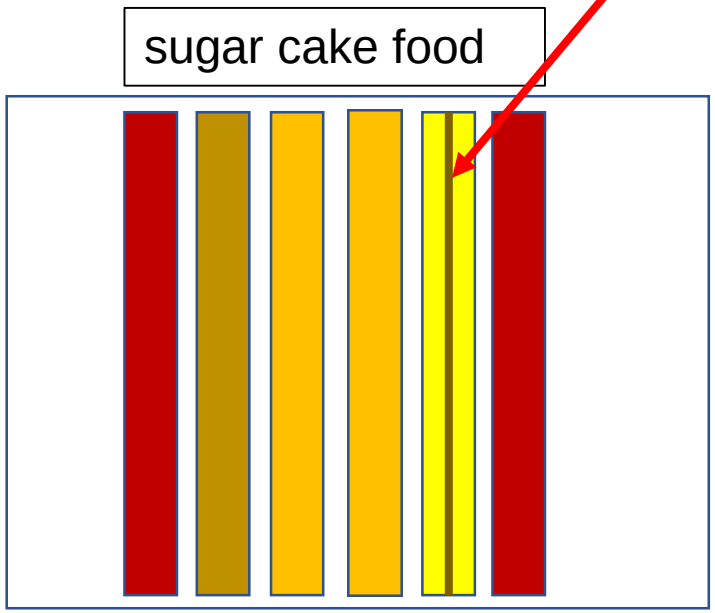
After 3 weeks of rapeseed flowering slow end of rapeseed flowering



Honey super with honey
we have to wait a few days
for the honey to ripen

A young bee queen
before mating
(before fertilization)

The swarming mood increases -
it's time to weaken the colony
and prepare the artificial swarm



frames with broods

frames with honey

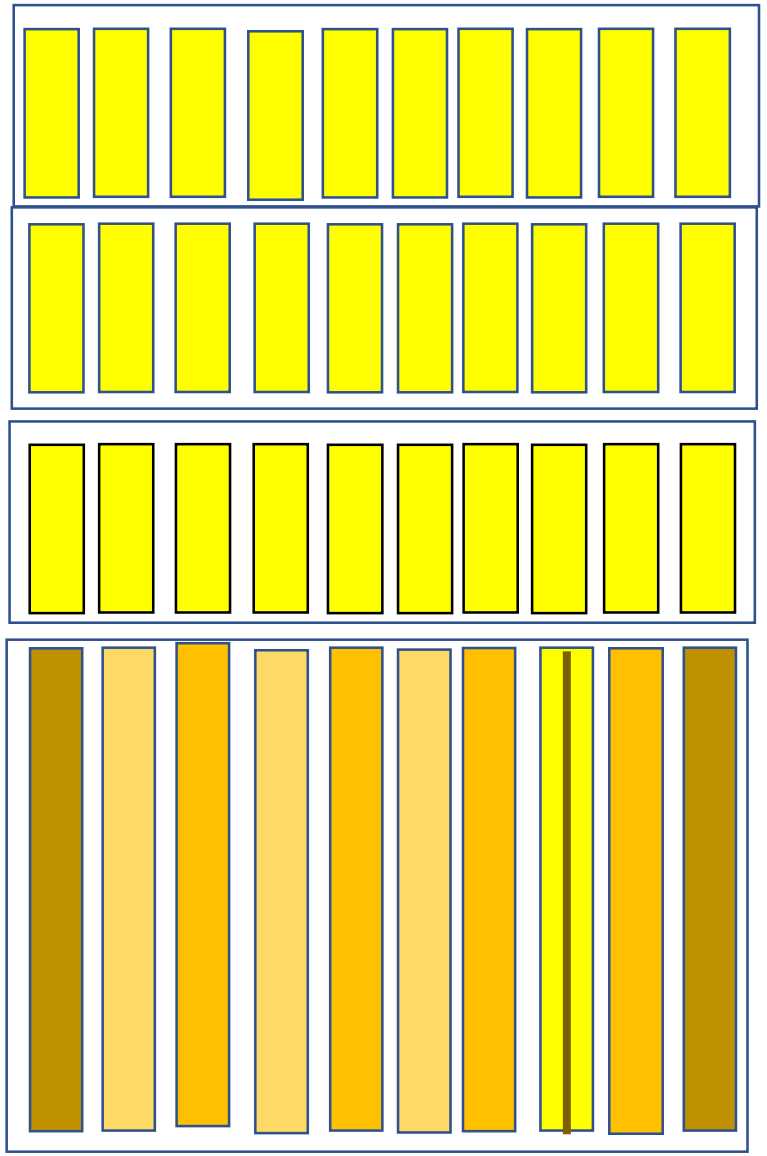
Rebuilt honeycomb

frames with bee bred

straw mats

Comb foundation

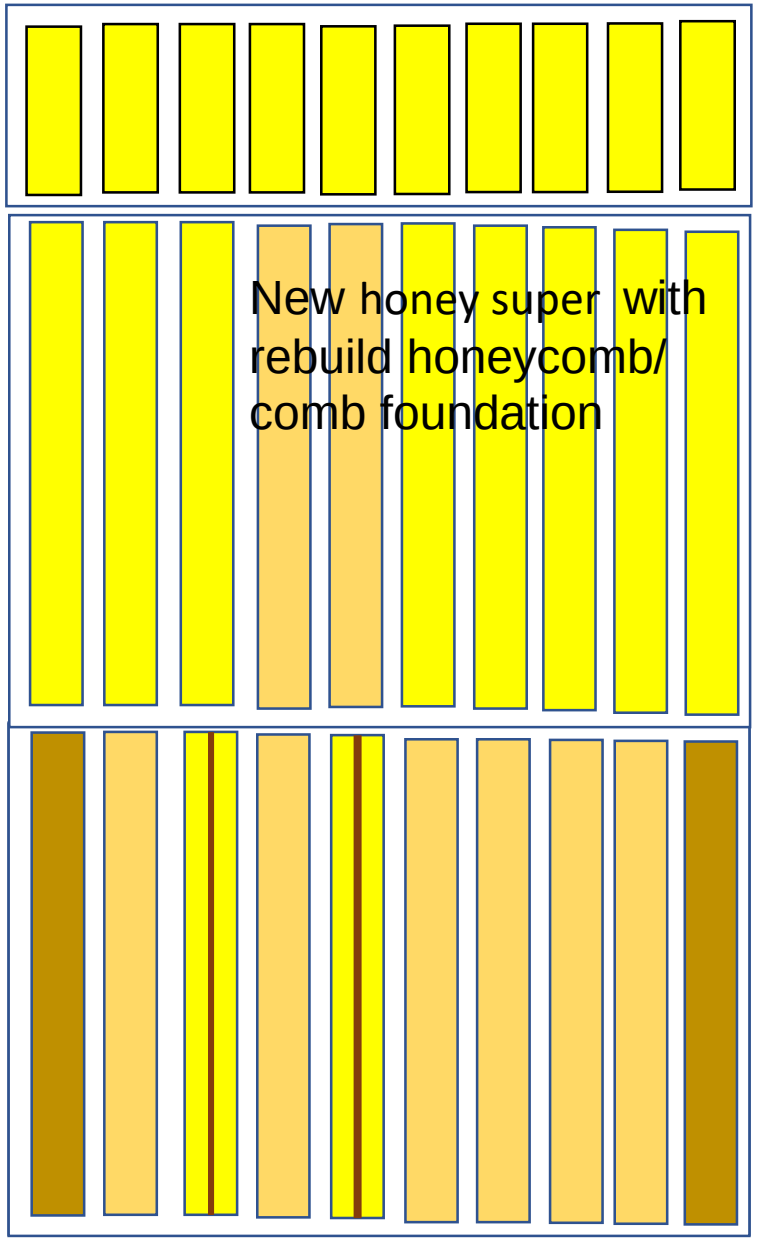
The end of May is time for 1 honey harvest.
We take the ripe honey from the supers. (Especially capped honey)



We never take all the honey. At least 3-4 kg of honey must remain !!!!!!!

Unripe honey, some frames are empty - they remain in the hive

A hive after honey harvesting, ready for the next one nectar flow
***Robinia pseudoacacia* (black locust)**



frames with broods

frames with honey

Rebuilt honeycomb

frames with bee bred

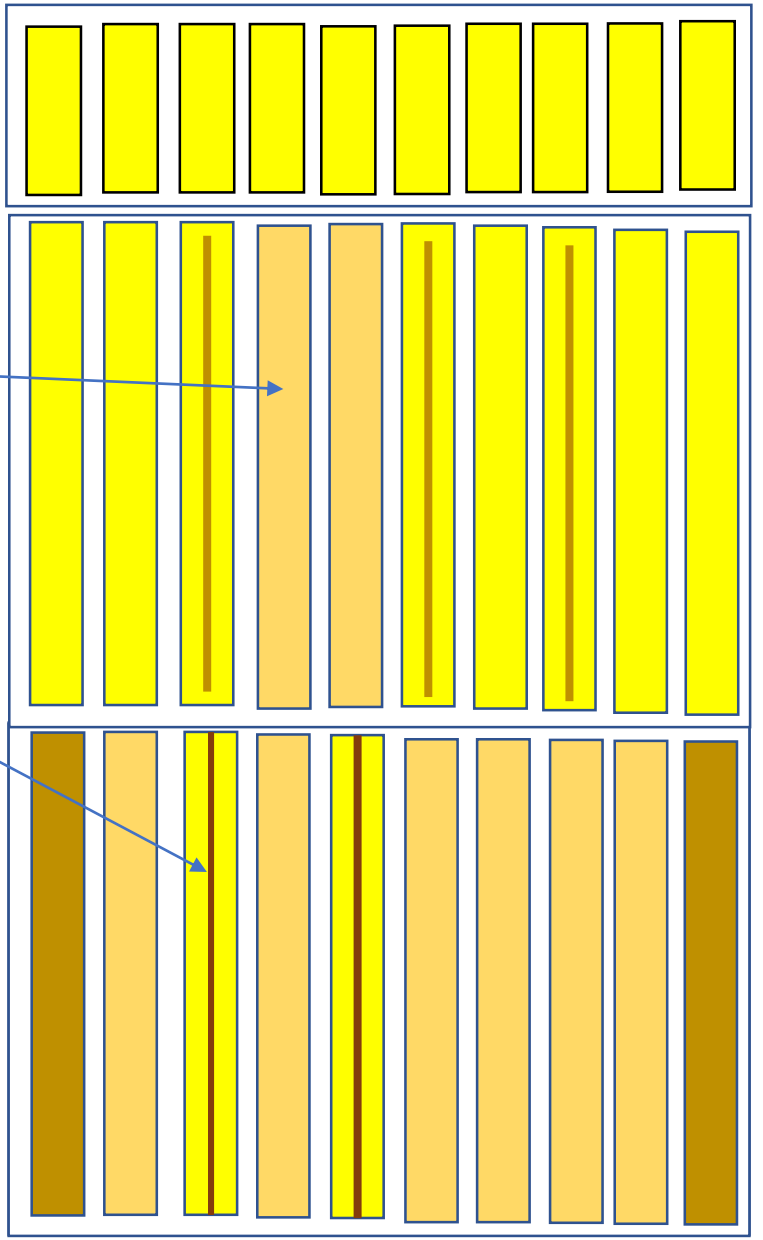
straw mats

Comb foundation

The beginning of ***Robinia pseudoacacia*** flowering

Robinia blooms around June 1, and blooms for about 10 days

Only covered brood is transferred to the upper box. The place in the brood box is filled with a comb foundation



frames with broods

frames with honey

Rebuilt honeycomb

frames with bee bred

straw mats

Comb foundation

Between 15 and 20 June the honey is ripe.

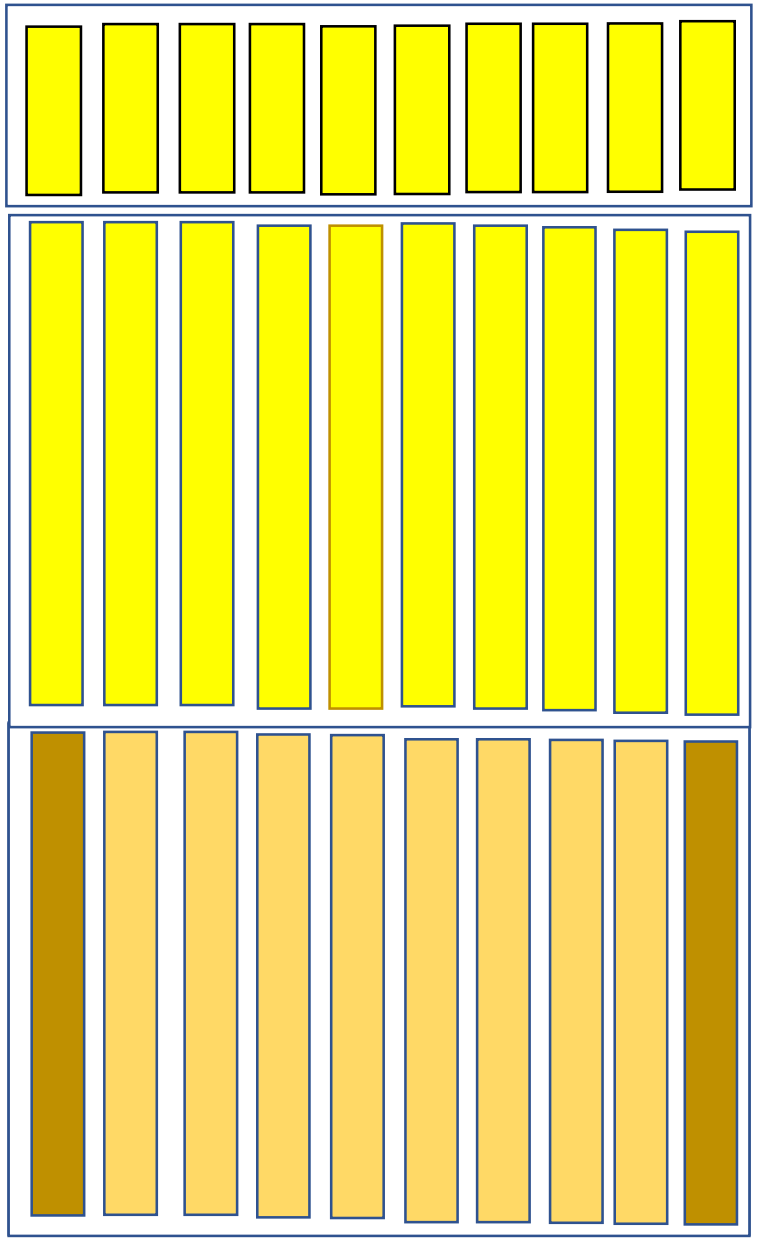
Robinia blooms around June 1, and blooms for about 10 days

We carry out honey harvesting taking full frames for centrifugation

Multiflower honey (rape/acacia)

pure robinia honey

We never take all the honey. At least 3-4 kg of honey must remain !!!!!!!



frames with broods

frames with honey

Rebuilt honeycomb

frames with bee bred

straw mats

Comb foundation

We wait about 10 days.
On July 1, buckwheat will bloom

Buckwheat blooms
1 - 21 July

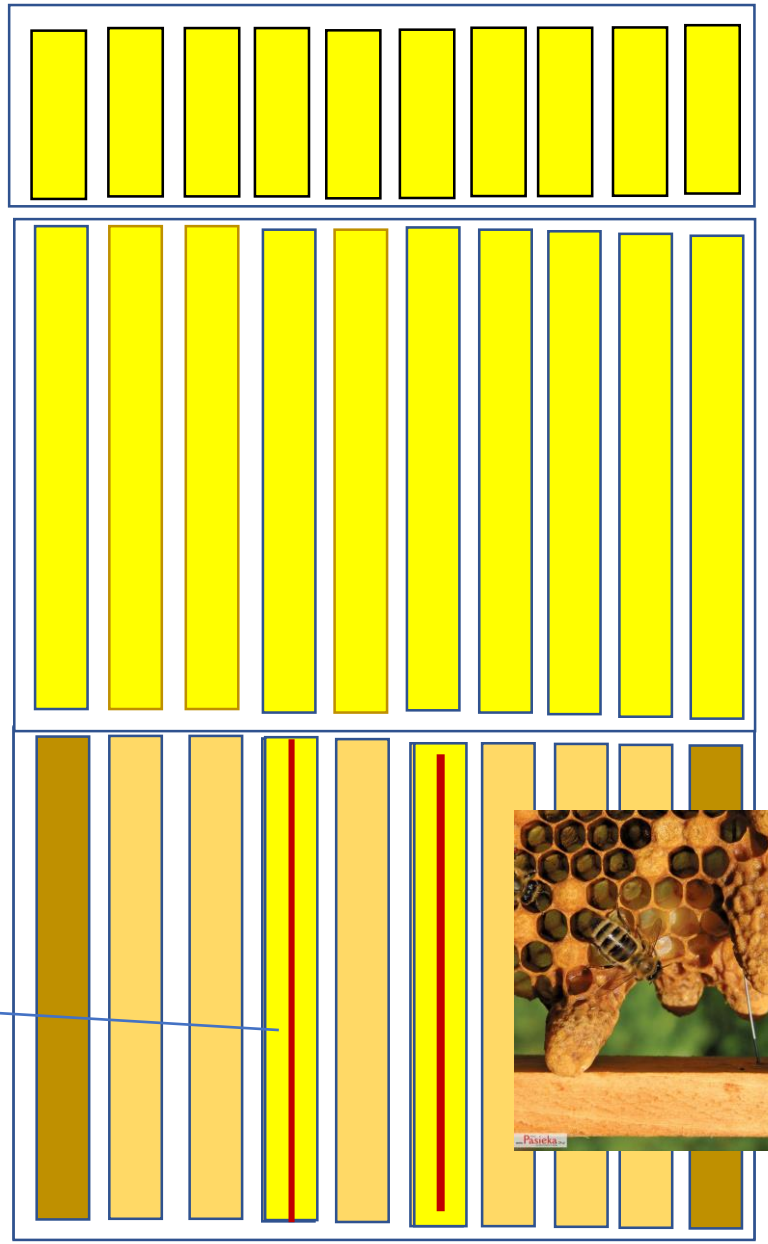
Between June 20 and July 1 - bees collect nectar from various flowers mainly for their own needs, or they use the remaining honey supply.

After the buckwheat blooms, they begin to accumulate nectar in honey super

We constantly check **the swarming mood**, if we find queen cells:

- we remove them,
- we remove brood frames from the hive,
- we remove some of the bees from the hive

we create a small artificial swarm



frames with broods

frames with bee bred

frames with honey

Rebuilt honeycomb

straw mats

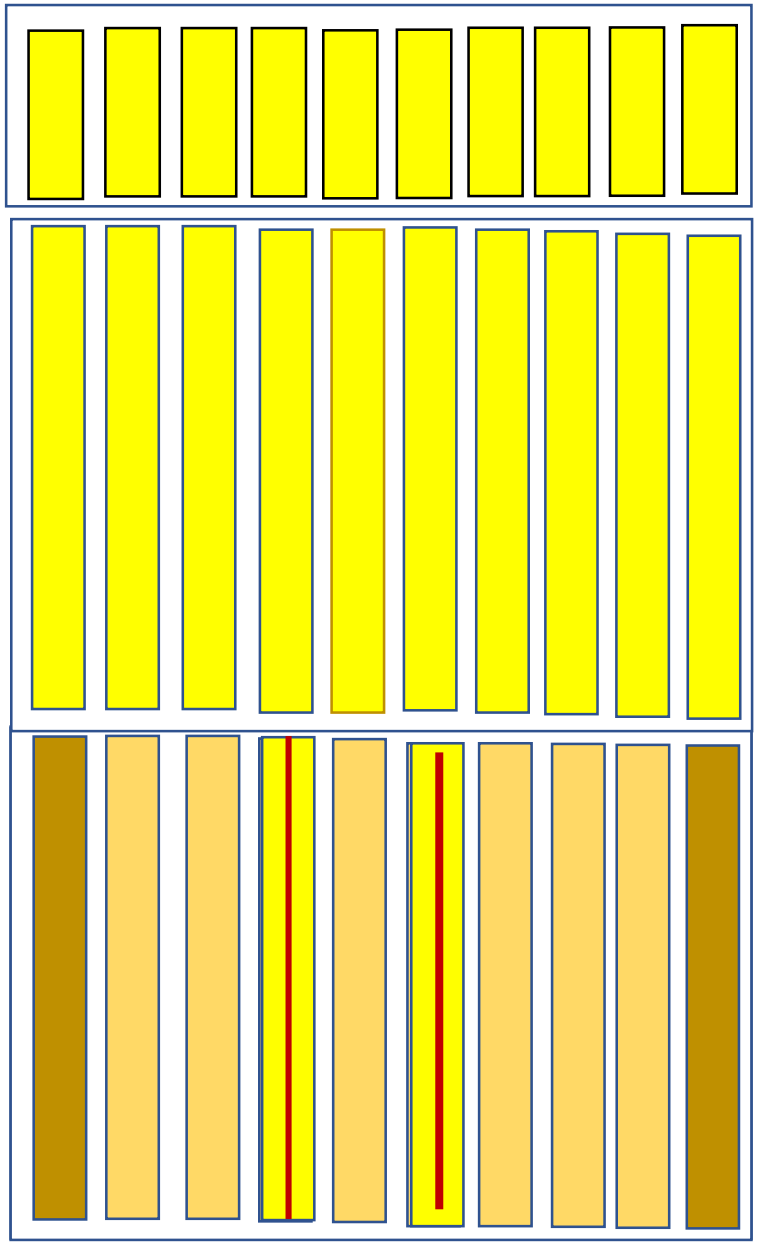
Comb foundation

On July 10, buckwheat is still blooming

Buckwheat blooms
1 - 21 July

We do the next inspection after 7 - 10 days

If there is enough space for honey and there is no swarming mood.
The layout of the frames does not change



frames with broods

frames with honey

Rebuilt honeycomb

frames with bee bred

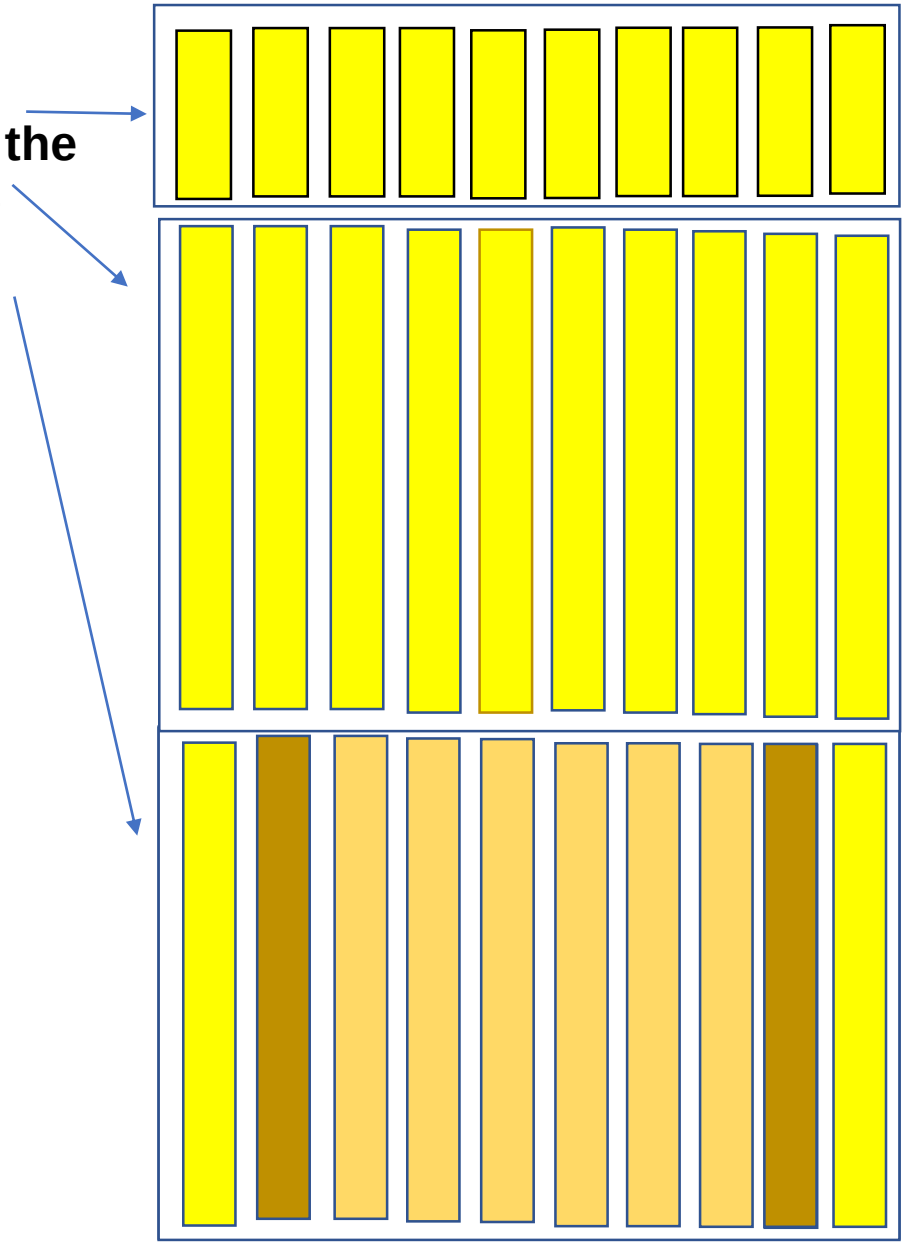
straw mats

Comb foundation

Around August 1, buckwheat honey harvesting

Buckwheat blooms
1 - 21 July

If this is our last honey harvest, **we take all the honey.** From honey super but also from the brood box.



frames with broods

frames with honey

Rebuilt honeycomb

frames with bee bred

straw mats

Comb foundation

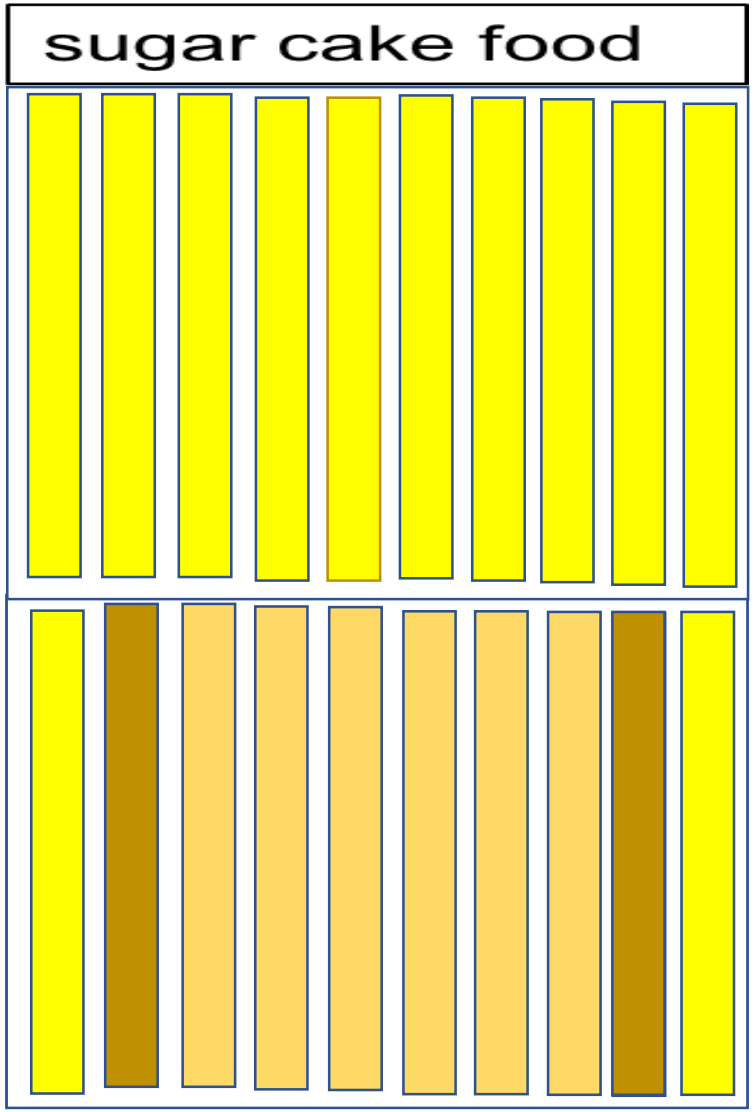
Around August 1, buckwheat honey harvesting

Buckwheat blooms
1 - 21 July

After honey harvesting, we adjust the size of the hive to the number of bees

There is little nectar in the area, so we feed the families with small doses of sugar syrup or sugar cake

Stimulation of the mother to lay eggs.
The generation that will be wintering !!!!!!!!



frames with broods

frames with honey

Rebuilt honeycomb

frames with bee bred

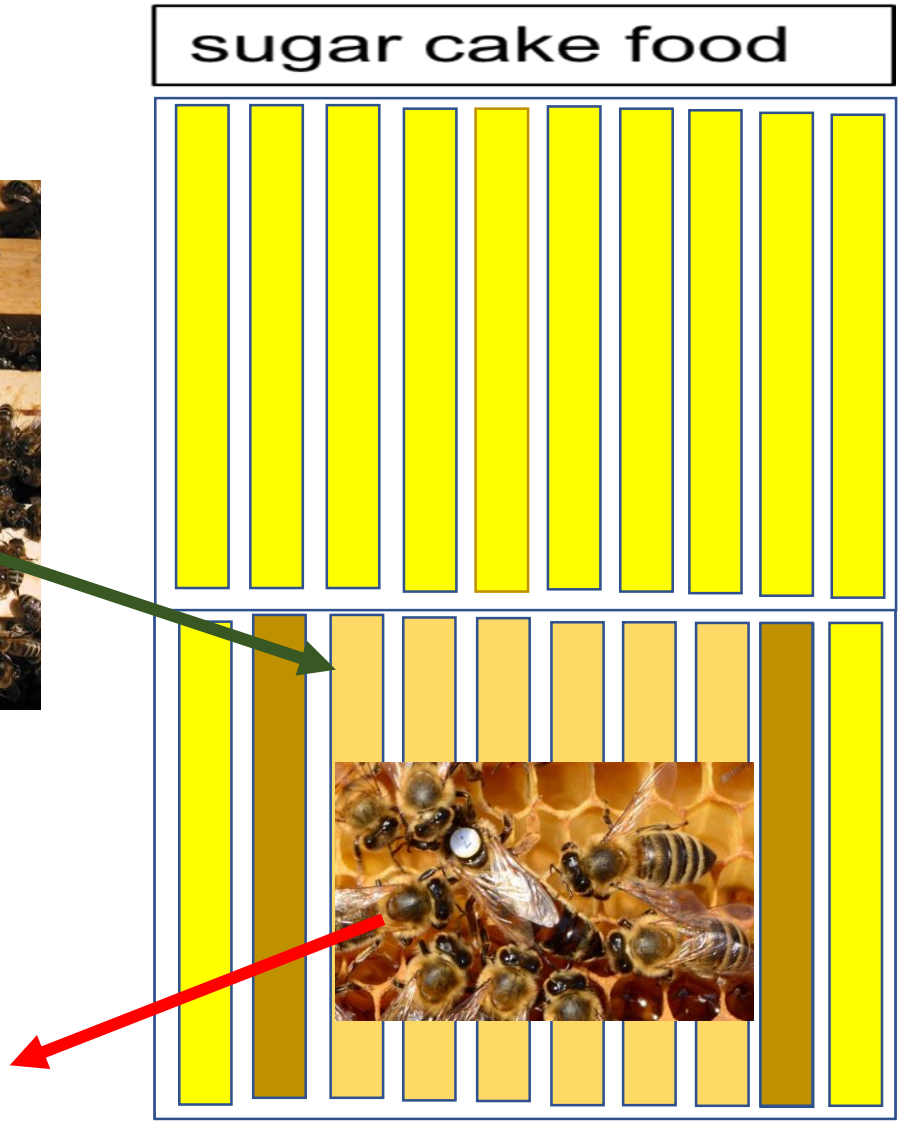
straw mats

Comb foundation

Late July and early August is a good time to exchange queens

We remove the old queen and add a new **inseminated/fertilized** queen to the colony.

A new mother in a cage



frames with broods

frames with honey

Rebuilt honeycomb

frames with bee bred

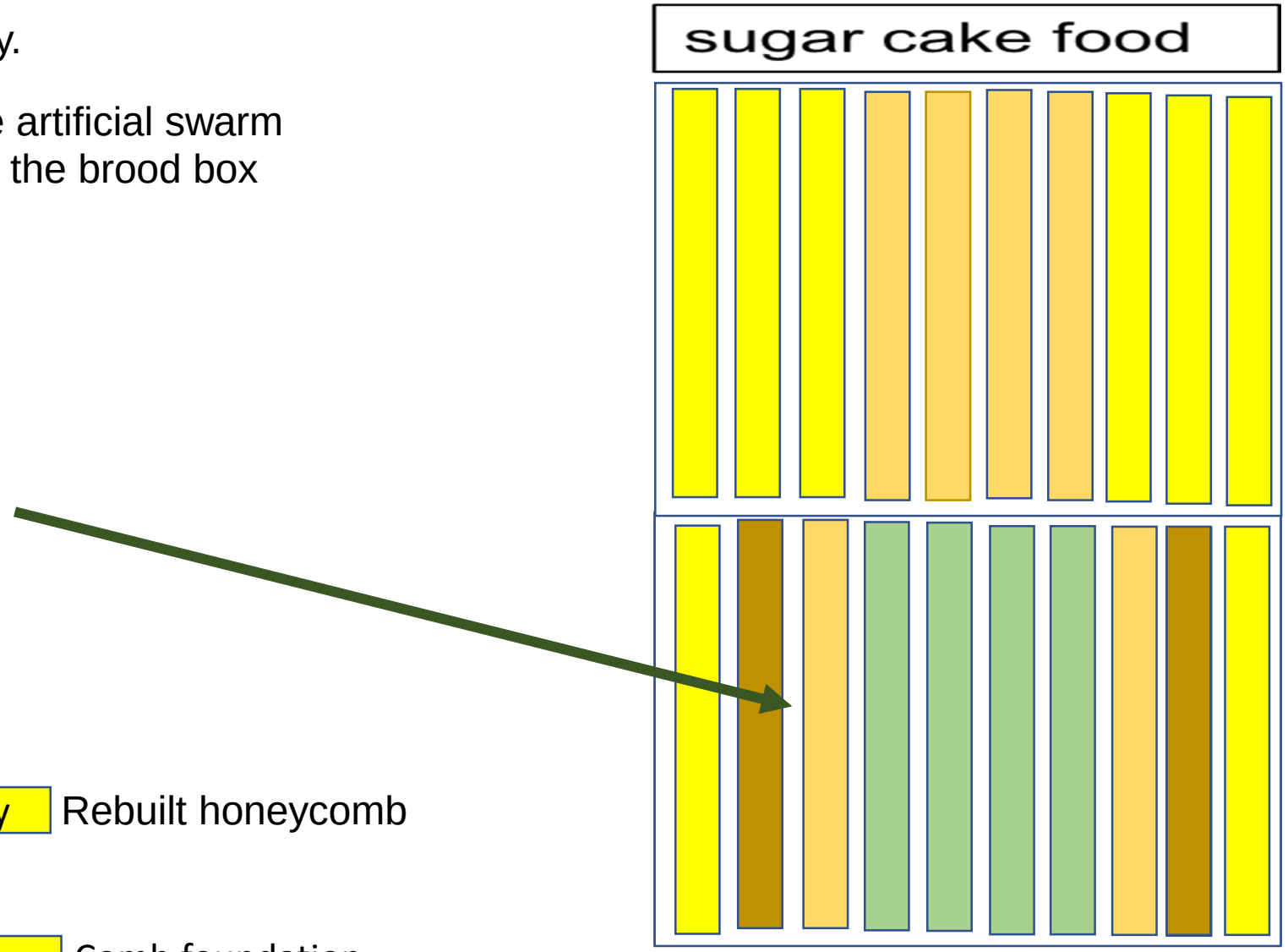
straw mats

Comb foundation

Late July and early August is a good time to exchange queens

We remove the old queen and add a new **inseminated/fertilized** queen to the colony.

We put the queen together with the entire artificial swarm (frames, brood, accompanying bees) into the brood box



frames with broods

frames with honey

Rebuilt honeycomb

frames with bee bred

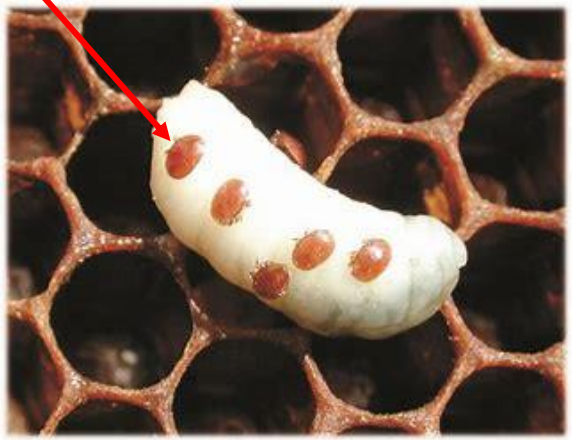
Artificial swarm

Comb foundation

Late summer and autumn is the time to treat bees against varroa destructor

August - November

Varroa destructor



Varroosis - a disease caused by the Varroa destructor **mite**, **developing on brood and adult honey bees**. The female mites feed on the **haemolymph (but probably prefer the fat body)** of the infested insects. The development cycle lasts 9-10 days. After this time, the female mite lays 3 to 6 eggs in sealed cells with brood, of which about 2/3 females and 1/3 males hatch.

Late summer and autumn is the time to treat bees against varroa destructor

Varroa destructor

We use various preparations according to the instructions for use.

Product name	Active substance	Dose	Form of use
FORMICPROTECT	*Acidum formicum*	68,2 g/pasek	strap for hanging in the hive
API-BIOXAL	*Acidum oxalicum dihydricum*	62,0 mg/ml	
APIVAR	*Amitrazum*	500 mg	
OXYBEE	*Oxalic acid dihydrate*	39,4 mg	solution for use in the hive
VARROMED	*Formic acid + Oxalic acid dihydrate*	555 ml: 5 mg/ml + 44 mg/ml	
POLYVAR YELLOW	*Flumetrinum*	275 mg	strap for hanging in the hiv
APIGUARD	*Thymolum*	12,5 g/taca 50 g	gel
APIGUARD Multidose		0,25 g/g	
BIOWAR	*Amitrazum*	500 mg/pasek	strap for hanging in the hiv
THYMOVAR	*Thymolum*	15 g/pasek	
API LIFE VAR	*Camphorum + Levomentholum + Eucalypti aetheroleum + Thymolum*	(3,8 g + 3,8 g + 16,4 g + 76,0 g)/100 g	soaked plate
APIWAROL	*Amitrazum*	12,5 mg	fumigation tablet
BAYVAROL	*Flumethrin*	3,6 mg/pasek	strap for hanging in the hiv

Late summer and autumn is the time to treat bees against varroa destructor

Varroa destructor

We **hang the strips** between the frames in the brood box

Late summer and autumn is the time to treat bees against varroa destructor

Varroa destructor

We <u>burn the tablet inside the hive</u> or <u>blow the smoke</u> inside the hive.

Late summer and autumn is the time to treat bees against varroa destructor

Varroa destructor

We put the preparation on top of the frames and the substance evaporates into the hive.

At the end of august/beginning of september we start feeding the bees

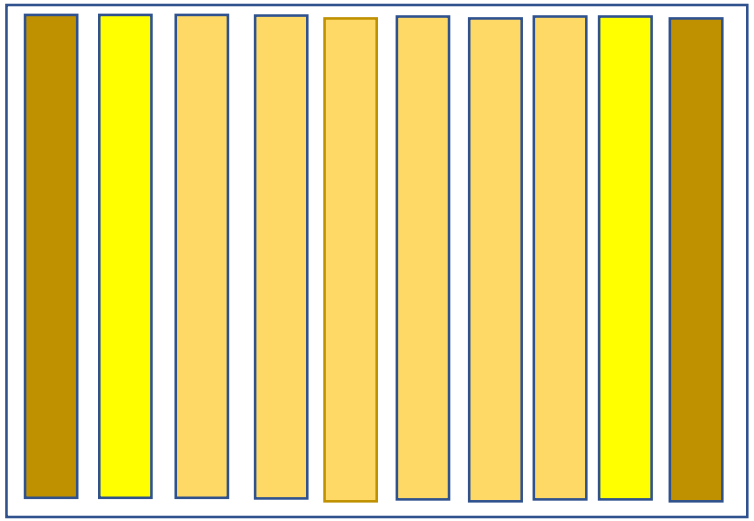
We reduce the size of the hive. If the number of bees allows it, even to one brood box.

The hive contains brood, honey and bee bred.
During feeding, the bees will transfer sugar syrup in place of the brood

For the winter we give about 10-15 kg of sugar.

upper feeder

inter-frame feeder



frames with bee bred

frames with broods

Artificial swarm

Comb foundation

frames with honey

Rebuilt honeycomb

At the end of august/beginning of september we start feeding the bees

The hive contains brood, honey and bee bred.
During feeding, the bees will transfer sugar syrup in place of the brood.

For the winter we give about 10-15 kg of sugar.

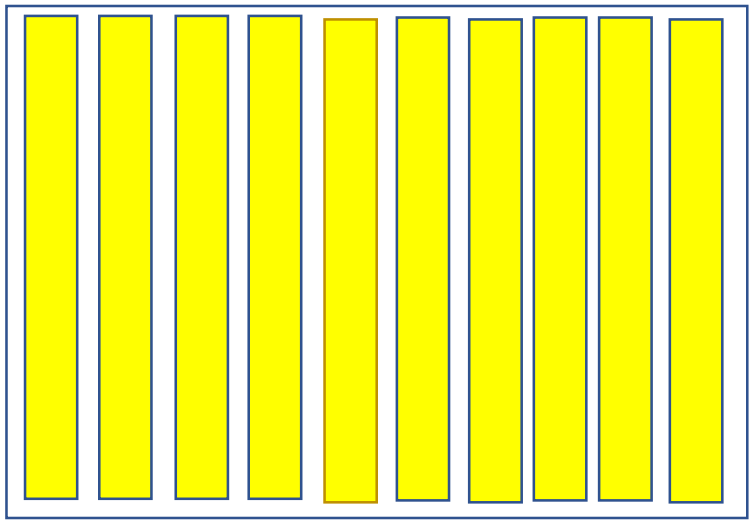
We **use sugar or ready-made syrups for bees**

solution

2 kg

3 kg

ready-made syrups for bees



frames with bee bred

frames with broods

Artificial swarm

Comb foundation

frames with honey

Rebuilt honeycomb

In the second half of September, we carry out a post-feeding inspection.

We check the amount of food in the hive

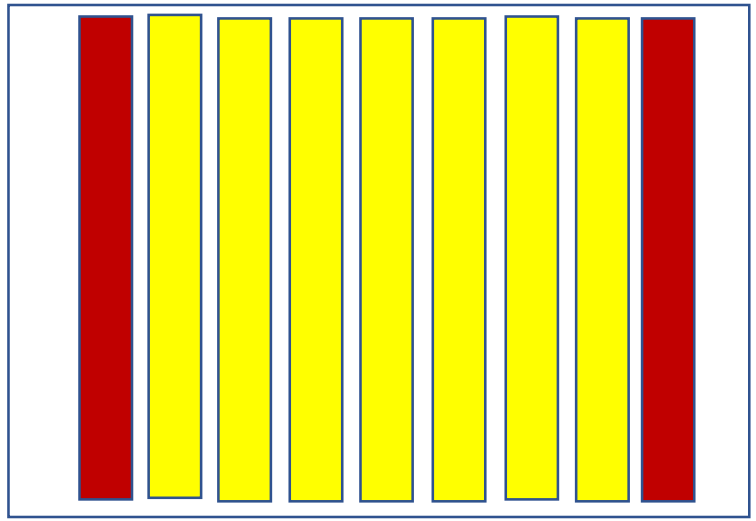
The amount of bees

There is usually a need to reduce the number of frames in a hive.

We usually take out the middle frames with the smallest amount of food

On the sides we put straw mats

The hive is ready for overwintering !!!!!!!



straw mats

frames with bee bred

frames with broods

Artificial swarm

Comb foundation

frames with honey

Rebuilt honeycomb

In winter, especially when the temperature is below 5^{o}C, we don’t look into the hives.

Bee pasture

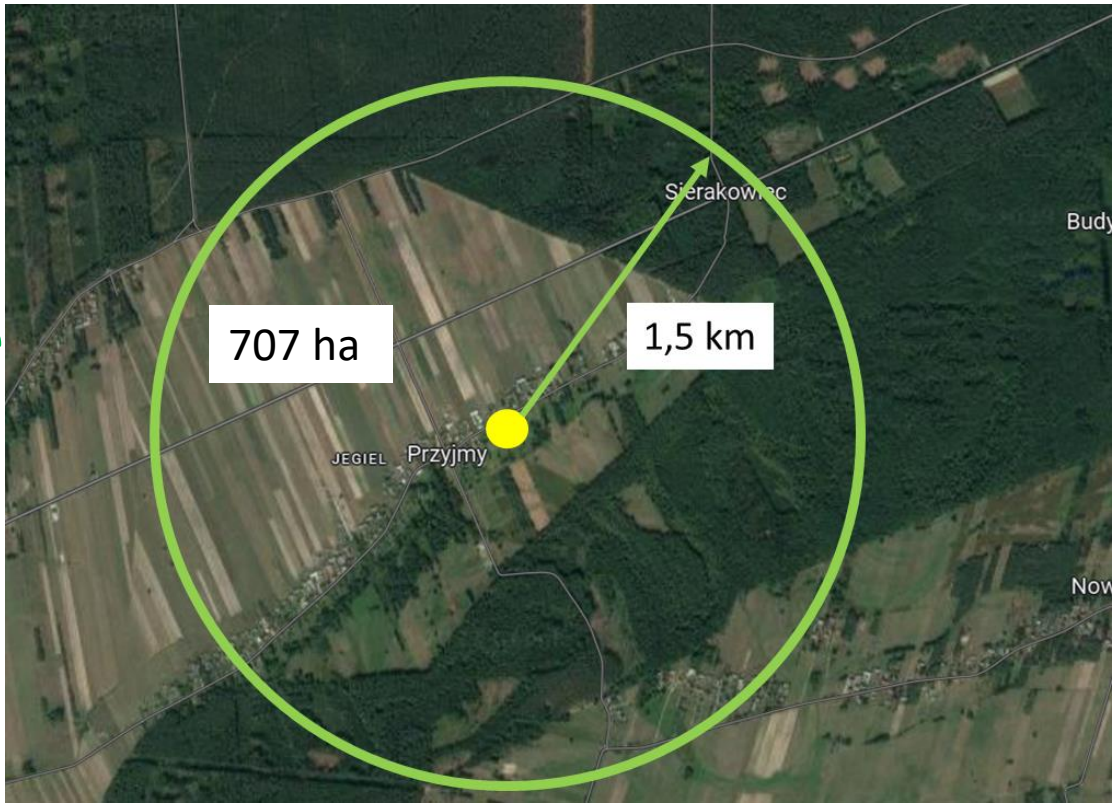
The area where the bees work

- radius up to 1.5 km

  effective flight distance of the honey bee
- radius up to 2 km

  less effective flights of bees
- radius 3 km

  maximum flight distance of bees



Availability of nectar for bees in a bee pasture

1. Area of individual plant species
2. Honey yield of individual species

} total abundance of the bee pasture

In fact, bees use about **50-60% of the resources**

remaining part:
collect other insects (wild bees, butterflies, etc.)
some will be washed away by rain
some will be dried by the wind

The use of nectar resources depending on the distance from the apiary

- to 0,5 km – 70-75%
- 0,5-1 km – 40-50%
- 1-1,5 – 25-30%
- 1,5-2 km 5-10%
- more than 2 km 5%

Honey consumption for flights (1 family)

- From flower to flower during the day - 400 g of honey
- to travel the distance to:
  - 50 m – 10 g
  - 500 m – 100 g
  - 1 km – 200 g
  - 2 km – 400 gram –the limit of profitability
  - 3 km – 600 gram

Honey productivity of plants:

Plants		kg/ha
dandelion	mniszek lekarski	20
rape	rzepak	105
apple tree	jabłoń	20
sycamore maple	klon jawor	40
mountain ash	jarzębina	15
American bird cherr	czeremcha amerykańska	10
black berry	czarna jagoda	50-100
forest raspberry	malina leśna	150
cornflower	chaber bławatek	300
white clover	koniczyna biała	100
black locust	robinia akacjowa	100
blue phacelia	facelia błękitna	200-300
small-leaved linden	lipa drobnolistna	100
buckwheat	gryka	150-200
Canadian goldenrod	nawłoć kanadyjska	300-600

We need to estimate the area under each species !!!!!!

It is very difficult and requires knowledge of the apiary area.