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INTRODUCTION

After initial rise in interest, the organic bee-keeping in The Republic of Macedonia is recording a downward trend. Starting with 505 bee-hives in 2005 in just 4 years there had been sharp inclination in number of bee-hives, reaching 15.455 bee-hives in 2009. Since then, the figures are on steady down slope. In accordance with data from the Ministry of Agriculture, Forestry and Water Economy, in 2015 the number of bee-hives is 6.932 bee-hives.

Reasons for this drop in interest for organic bee-keeping are numerous. Low price of certified organic honey, small and underdeveloped market, inability to organize themselves (the bee-keepers) in associations, lack of approved for use inputs, etc.

Still, it is hard not to mention that vast number of individuals that express interest to become organic know quite little about the organic principles, activities, process of certification and many other things they need to follow in order to become certified bee-keeper.

This brochure does exactly that. Provides knowledge transfer from an experienced in organic bee-keeping person to all interested individuals who are considering shifting to organic production. It's written in easy-to-understand language while the included illustrations are contributing to the explanations given in text form.

Chapter I – BASIC PRINCIPLES OF ORGANIC BEE-KEEPING

1. How to choose location for the bee-hives

The location for positioning the bee-hives is quite a limiting factor. Therefore this needs to be considered from 2 aspects:

- Keeping the hives away from areas in which activities are taking place which disqualify it as a place on which organic bee-keeping is possible;
- If the potential location has the capacity to provide enough “food and water” for the bees all year round.

Organic bee-keeping considers use of natural honey and pollen as bees feed. Therefore, the location needs to “provide” these from the indigenous honey flora or from the plants grown on plots which also certifies as organic, as illustrated on figure 1.



Figure 1 – plot under organic anise

Starting from August ‘till October the plants in the vicinity of the hives need to provide enough quantities of nectar and pollen, which will serve the winter bees as food source, as this is the period in which bees are making winter food reserves.

Another thing the keeper needs to check is whether the location “provides” enough resources (plants that bloom early in spring) for the colonies to feed from February to April. In this period of the year bees need to collect nectar and pollen in order to develop maximum number of worker bees. Without sufficient number of worker bees, the colonies in the period May to July (and in higher elevations up to August) will not

produce good yields in honey and other bee products. If in any of the months in this period the plants cease to bloom, the colonies will become weak, will lose what had previously produced and in severe cases the colony might die. Providing feed in a form of conventional sugar, syrup or other kind of conventional intervention **must not be considered**, while use of organic sugar or honey is too expensive.

Hence, choosing the right location is of utmost importance.

It is to be known that there are locations in which at certain period of the year there is an abundance of sources of nectar and pollen. Then, in summer months drought becomes apparent and in such conditions there is no plant bloom, which results with nothing for the bees to collect. This strongly affects the queen to lay eggs (event stops) and in severe cases the colony starts to starve. Should this condition be of extensive nature (July-August) bees will enter in “summer hibernation” which makes weak colonies i.e. limited number of worker bees. Ultimately, in the winter period (January-February) these colonies might cease to exist. If the winter is mild and the colonies survive, they will strive to develop normally and to reach full-strength development before the main period of activity. This means that honey yield and production of other bee products will be quite low, thus making very little or no profit at all.

In such cases, it is best to change the location, on higher altitude. On these elevations the full blooming activity of the plants is a bit later. Furthermore, this is the season in which forest plants are blooming, thus having a possibility to obtain dark colored honey (forest origin). The new location **must** be in compliance of the criteria for organic bee-keeping.

From legal point of view, the location is determining factor in the certification process. Should there in radius of 3 km be a processing facility emitting pollutants, the location cannot be considered for certification. The same happens if in the surrounding area crops are being grown in intensive way on large plots of land. There must not be roads with higher vehicle frequency in the vicinity of the location, or near the place from where the bees are collecting nectar, pollen and producing propolis. Hives in close proximity to regional roads, regardless of low vehicle intensity cannot be considered for certification too. Risk analysis and chemical analysis can serve as an instrument to resolve the dilemma if certain location is suitable or not.



Figure 2 – Suitable location for positioning the hives

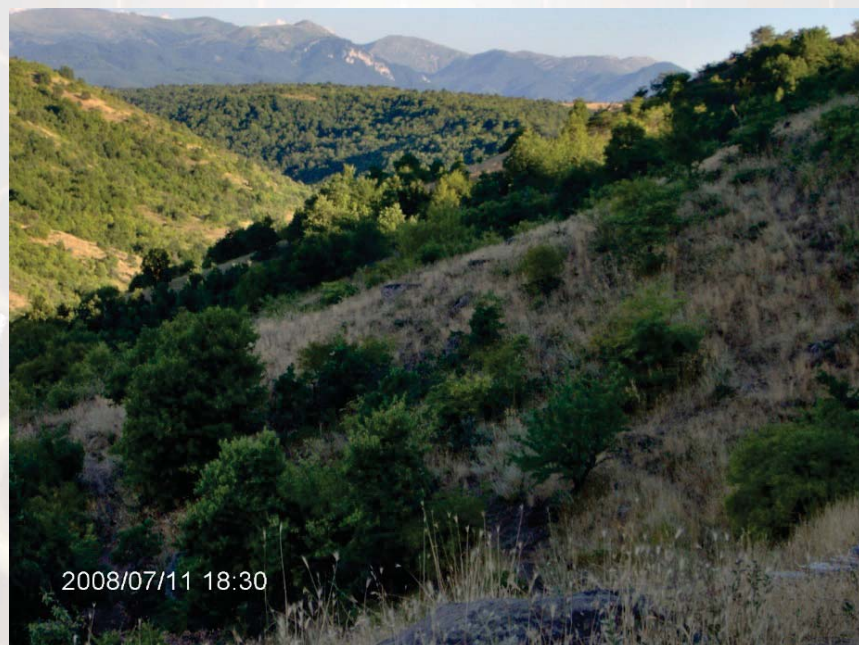


Figure 3 – Suitable location for positioning the hives

2. Equipment and material for use in organic bee keeping

The most frequent material for hive production in the Republic of Macedonia is wood. However, there are examples for hives produced of plastic or Styrofoam. Most frequently pine, fir, poplar, aspen are used as wood resource. In the fabrication process it is allowed to use metal nails, bolts wire and metal sheets. Glues containing synthetic materials, which through evaporation can get in touch with bee products are prohibited for use.

In accordance to the materials the equipment for disattaching the frames, the centrifuge, honey strainers and honey storage vessels, the organic principles do not have set more strict regulation as compared to the conventional principle. In any case, it is required to follow in full the appliance of the Good Bee-Keeper's Practice.

There's not much difference with conventional equipment with regard to the remaining inventory bee-keepers are using in their daily routine, such are: the frame shovel, the hammer, queen excluder shovel, hive tool, pry nail, claw hive tool, etc. On the other hand, equipment used for application of synthetic materials **must not** be used in organic bee-keeping practice, as it can contaminate bee products.

The protection against weather to the hives and extension of their exploitataion period relies on several things. Firstly, the hives need to be well positioned, elevated from the ground by putting them over hand-made frame mady of wood, metal, stone, brick or any other material. The purpose is to provide better ventilation and quick drying of the moisture. For better protection of the hive, it is good to put several layers of natural-made protective finish with combination of vax and propolis. The best hive protection is obtained by soaking the hive into solution of linen oil, bee vax and extract of propolis.

Use of synthetic colors in organic bee-keeping is forbidden. In case already painted hives are to be converted into organic, it is allowed for those hives to be used, with condition not to be painted with synthetic protective colors.

The remaining equipment it is best to be made of stainless steel, which is basically with the same amterial as in conventional method.

2.1. Primitive bee-hives

In cases when there's a higher interest at stake (tourism development, etc.) the keeper may organize the bee-hives into primitive hives, made of natural elements (branches of various types of wood) covered with clay and cattle manure. Just after the bees will infest the hive, they will put propolis on the inner wall, and in such way a fully natural bee-hive is "produced". With this hives, the honeycomb is attached to the upper part of the inner wall and is immobile. This type of hive can suffer damages due to bad weather (heavy rain, snow), therefore needs to be properly protected on the outer side. The top cover is best if produced of natural materials i.e. rye straw or similar. Use of PVC film or any other synthetic material, as is black PVC foil is prohibited, since it contains tar.

2.2. Types of hives suitable for organic bee-keeping

All types of hives used in conventional bee-keeping are allowed for use by organic principles as well. The only thing that differs is the necessity to exclude the use of synthetically produced protective varnish, used to extend their period of use. However, the type of the hive is to be selected by the amount of “food” (read plants) the bees will have in their surrounding area and the amount of time the keeper will spend during daily operations.

In The republic of Macedonia the following hive types are in use: Dadan-Blat, Langstroth and Farrar. There are individuals who have modified these types, but they are in the minor number,

For the beehives located in an area with abundance of flowering plants that bloom early, and by that the main collecting activity is in May, it is recommended to use the type of hive with smaller brood box frames as in Farrar hive. This type makes conditions swift colony development by providing many possibilities for manipulation of the frames in the honey supers and deep super. Furthermore, due to the small honeycomb dimensions, the bees are filling them much quicker and faster honey maturing process, thus providing possibilities for obtaining monofloral honey, as well as earlier production of queens and swarms.

The Langstroth hive, by design is a transition from Farrar to Dadan-Blat hive and possesses characteristics suitable for both hive-types. But, due to its larger frames’ dimensions in which the honeycomb is located, the bees do not succeed in filling all the frames with honey. Therefore, the honey obtained from this type of hive is multifloral (a mixture). On the positive side, for the dimensions of the three parts that compose this hive are the same, this provides possibilities for large number of combinations in rotating of the frames, which makes it suitable for intensive bee-keeping i.e. honey-production, queen production and production of swarms..



Figure 4 – Organic bee-hives with Langstroth hive

By dimensions of the honey supers and deep supers, the Dadan-Blat hive is bigger than the previous ones. Due to this characteristics, this type of hive is more suitable for so called stationary bee-keeping. The advantage of this hive type is in the bee's possibility to make it through the winter period without significant interventions by the keeper. This is because Dadan-Blat hive's deeper super is located in the lower part of the hive and is with longer frames. This gives possibility to the bees to make bigger honey-caps, and still to have substantial space in the lower part of the frame, where the winter bees club is positioned. In such position, the bees have access the food for the winter by simply moving the club from bottom to the top, which is not the case with the other hives type having shorter frames. These hives do not possess enough space on one of the sides to store enough honey in one frame row. In such case, in order to reach the next honey frame the bees need to pass the space of the rubber, the empty space to the lower cover and the cover of the next frame, and in certain cases the empty space from the bottom board up to the honey. Such movement is not an easy task for the bees' winter club, especially when external temperatures are below 0 °C. On the negative side, this type of hive is quite heavy, hard to transport, manouverings are limited to only few possibilities as opposed to the other hive types. And finally, due to this limitataions, the possibilities for swarm production is smaller. Yet, on the positive side, the bees, with smaller amount of activities by the keeper achieve solid spring development and have some production. Hence, this type of hive is suitable for persons is suitable for keepers with less available time.

In any case, for intensive bee-keeping which includes frequent moves from one place to another, it is recommended to use the Farrar hive, while for more extensive kind of activity it is recommended to use Dadan-Blat. Langstrot's hive can be used for mixed kind of activity.

2.3. Organic wax

In organic beekeeping the honeycomb which develops and produces the bee products and the bee community must be built from organic wax, which was obtained from the sale or is produced from organic bees wax, obtained at the same apiary.

Since in The Republic of Macedonia there are no possibilities to purchase organic wax, the beekeeper is obliged to replace the conventional with organic wax. During the transitional period can be produced organic wax although most of the wax in the honeycomb is conventional. As organic wax at the time considered, is the wax obtained from the wax caps that

the honey is folded within and all the later produced honeycombs which can be separated as such by the beekeeper. In the normal production of honey from honey frames which is produced 1 t of honey, we get about 10 kg organic beeswax from wax caps. But since in this period there is a necessity for larger wax quantities here are several ways to obtain larger quantities of organic wax.

If in the extracting super of any type the number of frames is reduced to two, and the rest of the frames is dispersed evenly, then the bees extend the honeycomb cells with organic beeswax. This way we provide a greater amount of wax and decrease the number of frames per hive, which means that to a certain extent we are reducing the working time required for manipulation of extracting super frames.



Figure 5 – organic wax

Also, from the older honey frames we can cut the honeycomb, and to leave only about 1 cm honeycomb in the section attached to the rabbet. This can be performed on each second frame of the extracting super. We must not repeat the same procedure to all honey frames, because if there is no built frames in the extracting super which serve for driving direction in building the new honeycomb by the bees, in some cases the bees begin to build a new honeycomb in different directions, thus making a conglomerate of frames after which the beekeeper should intervene by cutting the problematic honeycomb, which requires more labor, knowledge and attention.

In this procedure, in order to prevent climbing queens and laying drones eggs in newly built honey frames it is necessary to use a queen excluder grid, because it will lead to unnecessary spending of bees and honey in the production of drones, which are not required in so great number.



Figure 6 – Honeycomb built without base wax and filled with dominanatly drones bed.

Figure 7 shows that the majority of the cells are with drones. This should not be allowed, because only a small part of the combs are used to produce worker bees. Most of honeycomb production is lost on drones which uses up large amounts of food and will pose a problem if the performances in unfavorable period (drought, no blooming plants).

For the production of wax should be regularly used the building frames whose other purpose is the production of honeycomb for drones in the brood chamber, part of the hive where the queen lays the drone eggs. Drones larvae attracts the tick from the whole hive to dwell on them, and the removal of a drone's honeycomb provides removal of most of the tick in the hive. As a by-product of this activity we get organic wax.



Figure 7 – production of organic wax in honeycomb

After processing, the organic wax should be shaped in the honeycomb shape to re-utilized in the apiary. Shaping can be performed by companies or craft workshops, which are equipped for this purpose and have been certified as organic wax processors. The companies/workshops involved in processing must be inspected by the certification body to check whether any in part of the process of processing of the organic conventional wax wax added. Adding paraffin, artificial colors or other componenets of synthetic origin in the wax **is not allowed**. An operator who processes organic wax can only be specialized for processing of organic wax, but is allowed to process conventional too.

The operators processing organic and conventional wax must thoroughly clean the equipment and must record that procedure, after which they may process the organic wax.

There are manual presses to shape the honeycomb bases that can be purchased from the market or made manually. These presses can be used in organic beekeeping so that the beekeeper can process his own organic wax on his farm, respecting the rules that apply to companies that are certified for that purpose.

CHAPTER II – BEE-KEEPING TECHNOLOGY

There are three periods in a bee colony life cycle:

1. Overwintering
2. Intensive development in spring
3. Production of production

Each of the periods are important for bees' survival, but preparations for overwintering is a kind of beginning for the next year.

3.1 Bee keeping technology for August – October

In fact, August is the first month of this trimester in which the colony begins with the preparation for the forthcoming winter period.

One of the most important thing to do in this month is to perform a detailed check of the colony. The importance of this activity rises in significance, knowing that through this check it is possible to identify all the factors that can have an influence over the colony's preparations to survive the winter period. And these items are:

1. Are there enough laid eggs?
2. If the colony is well supplied with food, is it fresh and is it with good quality?
3. Is there tick infection?
4. What is the honeycomb quality on which the bees will spend the winter period?

Best case scenario is considered if by August the colony has at least 15 kg of floral honey, located just above the honeycomb on which the winter club will be located. This honey must be fresh and capped with wax caps. The frames located on both sides of the brood should be filled with honey as well. If the apiary is located on higher elevation, in forest, it is possible that the bees had brought honey "medlikovec" and had stored it within the brood frames. This type of honey is dangerous as its content is high with undigestible matters for the bees. And this situation is high in hazard since the bees during winter are in a form of cube, do not go out of the hive for quite extensive amount of time to defecate. In case cold weather is present, with temperatures below 12°C the bees cannot fly out to defecate and due to this their stomachs are rising causing flatulence and inflammations. As a result to this case, diarrhea and nosemosis can occur, resulting in huge colony losses in the apiary. Therefore it is preferable if the bees are having light, meadow honey as feed source for the winter. Should here be "medlika" honey, it should be removed and provide additional

feed with meadow produced honey. In case there is no such honey, the keeper should inform the certification body, upon which it is allowed to add feed composed of diluted solution of sucrose or other sugar.

For this month it is also important the hive to have at least 4 frames with laid eggs. The bees that will emerge from August 'till the time when the queen will stop to lay eggs (October-November) will form the winter clubee. These bees are the individuals that will make the colony survive the winter and will "produce" new worker bees for the next season. In specific cases, in warmer parts of the Republic of Macedonia, during longer drought periods it is possible for the queens to stop laying eggs. Such condition is quite dangerous since the life span of the existing bees is reaching the end and they will not make it through the winter. So, in order to avoid such critical situation, it is of utmost importance to check the egg laying status in August. If such condition is taking place an interevention is required by giving feed made of honey syrup, or to dislocate the apiary in location where there is still blooming period of honey-plants. By moving the hives to more favorable conditions, we're providing conditions to the bees to start collecting pollen and nectar and by this they naturally stimulate the queen to start laying eggs again.

This month is critical for emergence of vaora as well, and if determined, activities for elimination of this pest must be applied. The varoa, or the tick as the bee-keepers are calling it is described in the parasites part of this brochure.

At the same time pay attention to the age and accuracy of the cells of the honeycomb that will find spring bed and if they are improperly constructed or too old, they need to be removed. In their place properly built honeycomb must be inserted. These honeycomb has to have had carried out at least two generations of bees. Otherwise, in the fall and spring the will be queen reluctant to or will not at all lay eggs because she's seeking for older and warmer honeycomb.

If in this period of the years there comes a drought rsulting with lack of feed resources, there is a strong possibility for honey plonder. Plunder is an attack from the stronger to weaker colonies. This process is undesirable as the attacking clonies will consume the honey and will kill the bees and the queen in the weaker colony. Defence against such activity is performed by narrowing the main entrances of the hive.

But if the plunder still does begin its prevention is difficult. If the plunder is at an early stage, it can be prevented by narrowing the openings to just one centimeter, so the bees under attack would be able to defend themselves against the invaders. But if the plunder is in advanced phase,

is best to close the hive completely. After half an hour open outer cover (the roof), so that bees that had come to “steal” the honey be able to leave the hive. Then the hive should be closed again and it is best to transport to another location where there are no other bee colonies. The bottom board of all hives in the apiary should be narrowed, especially those ones belonging to the weaker colonies. In some cases where only one particular colony plunders another colony, you can intervene by replacing their places. Shortly after this intervention the attack stops. Yet, activities for stopping the possibilities of plunder by narrowing the bottom board should be repeated.

If the plunder remains undiscovered, it can result in complete destruction of the bees and destruction of the honeycomb too. Such looted hives must be removed from the site in the apiary, cleaned and disinfected, because the smell that permeates of them irritate bees that in the absence of more honey in the plundered hive, continue to attack neighboring colonies. If no action by the keeper has been taken, plundering can become swift and cause loss of a large number of colonies in the apiary.

In order to avoid attacks by rodents in winter period, combs should be placed at the hive's entrance. These combs can be purchased or can be made of metal sheet. The spaces between the comb's spikes should prevent rodents to pass, but must provide free passage by the bees. The combs can be bolted or attached with nails. The colony which enters the winter period on Dadan-Blat hive have plenty of space on their disposal, so these colonies must be strong in order to warm-up such big space. If in case in these hives are residing “young swarms” it is best to spend the winter in nucleuses having 6-7 frames. In any case, the upper part of the outer cover (the roof) must be left with a tiny ventilation space, through which the hive will release the extra humidity. If no ventilation space is provided, condensation will occur under the outer cover. Such case shortens the hive's life-span, it is a favorable condition for mold creation and if such case becomes massive, drops can fall on the comb and the colony might be destroyed.

Langstroth hive has also a series of drawbacks in terms of the position of the winter cluster. In case of strong bee communities that occupy at least one third of upper trunk, hibernation can be good. This happens because even in the period of lowest season temperatures, the winter cluster community is located on the top floor, surrounded with enough feed and heat that is retained in the upper part, which will provide

smooth overwintering and spring development. In terms of the moisture, of course there must be a ventilation hole that is best to be located on the back of cover board. The lower part, now empty floor, serves as a very good insulation from external influences.

In both cases, if we have weak colonies for overwintering and a quite extended cold weather occur, regardless how well the colony is provided with feed, it can still die of hunger, because the bees that are in the form of condensed winter club will not be able to move in the area where the food is.

October is the month when the regulation of ventilation and placement of material to remove the moisture should be set, so it would be functional for the winter.

There are several ways to provide the hive to “breathe.” Often in the spring, if noting that the cover board of the hive was not well attached, we tend to believe that the bee community is dead or weakened. But very often we are always pleasantly surprised finding that those communities, on the contrary, have overwintered quite well.

The reason certainly lies in the removal of moisture generated in the basket greatly when spending the honey. If the basket has a hole on the top side through which as through a chimney the moisture is released a very important problem for overwintering has been resolved. Retention of heat in the hive is achieved by placing warming material in the breakout part of the hive. This material can be wrinkled paper from newspapers that very well absorbs moisture from the crates. If necessary during the winter the old paper already moistened it can be replaced with dry one.

3.2. Bee keeping technology for November – January

In these three months bees are already deep into overwintering period and the only thing to be done is the treatment with oxalic acid which currently is the most effective protection against varroa.

The treatment is carried out when the outside air temperature is between 6 and 12 ° C. For the treatment is necessary to prepare 1 kg of honey solution and to add 36 g oxalic acid in crystals. The vessel in which the solution is prepared (usually bottle, closed tightly) should be well shaken so the acid crystals can completely be dissolved. Then, by using larger syringe apply the solution directly on bees. Every frame with bees should receive 5 ml solution.

It is of great importance to have correct placement of the hives in the winter. They should be slightly bent forward in order to prevent entry

of water inside the hive from rain or melting snow. The supporting system should be stable as heavier rains soften the ground and unstable hives can slope away and even fall. Such tremors, if the weather is very cold, would mean certain death for the bee colony, because bees can not return to the disassembled club. In a short period they stiff and die.

Protection against wind is important not only in this month but throughout the winter period. In fact the real danger of excessive cooling of the hive are not the low temperatures, but the humidity and the wind. If blowing for a longer period and with greater intensity it can be lower the temperature in the basket at -10°C .

That means that special attention should be given to the apiary position. As it should not be directly exposed to the wind but to be in covenant. The choice of venue for overwintering is determined by how it is protected from wind and moisture.

In organic apiculture feeding the wintering bees has to be with honey in sufficient quantities, without adding additional feed in winter. In contrast to this, in conventional beekeeping, queens are beginning to lay eggs later, just when bees begin with bringing natural pollen in their colonies.

The January bedding according to many theorists and practitioners is undesirable. It is recommended to open the bottom entrance door, thus increasing ventilation in order to prevent premature bed which usually only exhausts the colony, as it has to maintain a temperature of 31°C , for at least 30 days to be able to raise the bed. This bed is undesirable since January is unstable and cold month, while keeping the high temperatures over an extended period is quite difficult and requires a lot of energy. The other bees who cultivate this bed die sooner than bees that will take care of growing the bed a bit later.

It happens that some bee colonies lose their connection to honey frames thus remaining without honey. If detect on time those bee colonies can be saved by bringing the honey within the club or with additional feeding.

Winter feeding is one of most discussed issues. Yet, many theorists and practitioners agree that winter feeding is justified only in exceptional cases, when bee communities for any reason run out of feed. Experience shows that winter feeding prematurely activates the bee community, which is of a very negative impact, especially when winters are long and cold and does not provide conditions for frequent defecation by the bees.

But if adding feed needs to take place it should be done by adding crystallized honey. This kind of honey is solid or in semi-solid state and can be added directly on the frame carriers putted in a plastic foil. It is desirable that this honey to overlap half of the club as the bees could easily reach it, and it does not flow on the club. This operation should be performed in a warm, sunny day.

3.3. Bee keeping technology for February – March

February is the first month of the reference period when the bee community is in the development phase. The development takes place in the three-month period (February, March and April), just when nature awakens and starts to develop.

3.3.1. The first spring chek-out

The first spring chek-out should be performed when the temperature exceeds 15-16 °C. The purpose of this activity is to see if the bee colony survived the wintered well, if there is enough feed and whether there is a bed, as an indication that there is queen is present in the hive.

This activity should take as short as possible and to takes place in a way that only side frames are removed, while the presence of bed is concluded by looking sideways without removing bed frames.

This is the period when the bee community need most assistance by the beekeeper. Work performed in the apiary in February, March and April, directly affect the amount of honey that is to be harvested in the current year.

Cleaning the bottom borad and bottom entrance is also an important thing. While cleaning the it is very important to analyse the waste material, which can indicate how the bee community have overwintered, what is the situation with feed, hoe the ventilation operated etc. If near the bottom borad and bottom entrance there are 200-300 dead bees it tells well, that the community survived well. If there are only minor waste without wax mixture of crystals of honey, it is a proof that there was nothing wrong with the quality of the honey.

If the warming material is wet, should be immediately replaced. Heated wet material loses its function and instead warming, increasingly cools the hive. Therefore instaead of wetted material, dry paper should be used for replacement.

The way the new dry paper is installed should provide uninterrupted ventilation in the hive, so attention should be given to avoid blocking the ventilation opening. To this end can a piece of wood serve the purpose.

This piece is placed just before the ventilation opening to make enough space through which air will flow and moisture will be released out.

3.4. Bee keeping technology for May - July

May is the month in which the lower parts of the Republic of Macedonia begins the main flowering season for the bees. In this month changes in the bee colony occur with greatest intensity. Mainly, activities are reduced to ever-expanding royal residence in order to provide space for collecting honey and prevention or remediation of swarming instinct.



Figure 8 – Thyme in full bloom

3.4.1 Swarming

Although all the activities in May are aimed at obtaining high yields and preventing the swarming instinct (breeding) an integral part of the colonies in the apiary will form queens and pursue swarming. To prevent this, we first need to determine which communities have queens egg-layers.

Whether the bee community has queens egg-layers can be determined by the fact that the community reduces the intensity of collecting nectar, deep honey supers are emptier than in normal colonies, on the bottom board there are many inactivated young bees or there is established so-called beards of young bees that hang from the bottom board, the colony accepts harder added honeycomb foundations or have reduced production of wax.

Each community that refers to any difference in the behavior of normal colonies should be thoroughly examined.

Should there be presence of swarm layers in the brood there is a necessity to determine at what stage they are and if before closing and the queen still lays eggs, there are some actions to be taken in order to prevent swarming. We can simply crush all started swarm layers and add honeycomb foundations for building and expanding the basket. If they are closed and the queen reduces the size or is weakened and was about to fly-off, she has also stopped laying eggs. In such condition there are two possibilities remaining.

1. To provoke the swarming or
2. To wait for the swarm which is about to take off from the hive in one of the following days.

In this case, swarming in this case is done in a way that the queen is removed along with the frame on which she was found and is placed in a new hive or nucleus, which are added with a frame with closed brood which has already begun to be hatched along with a framework of honey and pollen. Once separated, the new colony is added and framework of honeycomb foundation for building is added.

In case of swarming, we should wait for it to position itself, most will land on a branch of a tree in the apiary or around him. The swarm is in a form of grape and can remain in place from several minutes to several hours, and sometimes until the next day. If not caught, it can raise and fly away in an unknown direction. These swarm colonies are hard to return to normal, and no honey yield should be expected. This leads to a conclusion that the bee-keeper should more frequent with a presence in this month.

In many cases, the bees swarm can be dodged into clean, freshly prepared hive rubbed well with lemon balm. Bees slowly and massively will start entering the hive, which does the queen too.



Figure 9 – Primitive type of hive for swarm collection

In the evening hours the swarm can be transferred to a prepared hive with frames with honeycomb foundations. This hive should be positioned on its permanent place, to mark it in correspondence to the type of the colony (first, second, etc. swarm, in which there are young, unfertilized queens).

3.4.2. Swarm nurturing

Nurturing swarms and the other communities swarmed in July, is especially significant for the second half of this month when number of blooming plants decline can easily lead to the situation in which the swarms and the colonies to face hunger. Therefore, if necessary, the colonies and swarms are additionally fed with honey or syrup in a form of added frames filled with honey taken away from the productive families. Also, if necessary, the swarms are provided with sufficient reserves of pollen and with well-built honeycomb.

If there is an extended period with high temperatures, there is a need to be look over to the possibility of overheating the swarms. This can happen if the colonies are located in places where there is no shade. In such case it is necessary to relocate the swarms in shade of trees, or to provide shading with branches, reeds or other handy material, making sure to avoid falling material and closing the door of the bees in the hive.

3.5. Techniques for accelerated development of the colonies

3.5.1. Feeding

Once the air temperature exceeds 18 ° C detailed inspection of bee families should be performed. Just like the first check, this check should be as short as possible, but attention should be given to all frames in the hive.

It is desirable to locate the queen's in the hive and check if it moves (fast and strong or weak and slowly), whether makes beds in the form of concentric circles and intensively, or bed is colorful and diffused. Strong and healthy queen is movable and makes beds in the form of concentric circles. If the queen behave as described, the whole colony will not progress in the forthcoming period.



Figure 10 – Bed made of good queen in March

March

To provide food for the new bed of which young bees will hatch, there should be more honey in this period in the hive. Also, during the first check special attention should be given to the health condition of the bed and adult bees.

Data from this detailed review are valuable for further action of the beekeeper. Firstly, clean the baskets in which bee communities are dead. It will give us an idea for the reason of the death. If found empty frames and empty cells without honey then it is clearly that the bee colony has died of hunger.

But, in case there is bees' feces on the fraems, and honey in the hive, then the colony has died due noseiosis. These colonies must be burned and the hives to be disinfected.

Colonies that have less than 3 occupied frames with bees are very weak and should be merged with other colonies. Such narrowing of the bees' nest is very important because in this way keeps the heat in the bee community and reduces the consumption of honey, and increases the brood.

The merger of the weak beehives and without queen should be done with colonies that are medium in strength. Mixing weak with weak beehives usually does not work. The best technique for joining two beehives is with the addition of the weak to a stronger colony, by inserting a sheet of newspaper.

First, to the lower and stronger colony that maintains its position we remove the cover, the excluder and inner cover. In place of the excluder a sheet of newspaper is inserted, on which we have made two - three small slits with a length of several centimeters. After this preparation, another super is inserted which should receive the bees from the weak colony. In a few days the bees from both colonies will gradually chew the newspaper, and in the meantime will equalize the smell and will unite around the brood. The frames with honey, if any, of the weak colony serve as feed for the acceleration of the spring development.

In this month it is not recommended to insert honeycomb foundations, unless in a case of emergency, when there are high temperatures and massive bloom of flowering plants

3.5.2. Preparation and adding frames with honeycomb foundations

One of the first tasks of the beekeeper in April is expanding bee nest.

In case of colonies that in March were narrowed to as many frames as occupied by the bees and were well warmed, these colonies in the first decade of April are massively filled with bees, their presence can be felt, and the frame that precedes the last one is prepared for laying. This is the right time for the new frames to be inserted.

Added frames can be built and even better if they have capped honey. It can be partially uncapped which will intensify the feeding process while emptied cells are laid by the queen

The established honeycomb foundation is inserted between the frame that has eggs and the frame on which there is flower dust. Following the same principles, unbuilt frames are inserted on which honeycomb foundations are positioned. After 2-3 days, check if the frame has been fully

built and layed with eggs. If filled with eggs, another frame is inserted, this time on the opposite side of the layer. Such egg-layer expansion in favourable years can provide up to 10 egg-layed frames in Dadan Blat hives.

In strong Langstroth hives the development is accelerated by relocating the floors i.e. the upper floor is positioned down, while the lower one goes up. By doing this, the colony starts moving the honey to the upper box, the queen moves to that box too and starts to lay eggs intensively.

In April, it is to be known that in certain cases already stored feed can become an obstacle for intensive development. Most frequent method is by decapping the honeycaps on an area of 10 cm² on the frames full with honey. In practice, this gives good results, and combined with turning every second frame by 180° the development would intensify.

Speaking in this manner, forced colony development and expansion of layer unit, it should be emphasized that prematural expansion can harm to the development of the colony.

April is the month that can be cold weather and in such cases, in order to keep colony's development continuous, they should be warmed up and feeding from the decapped honeycombs – intensified.



Figure 11– Intensive development egg-layer section

Manipulation with the boxes of the Langstroth's hive significantly can reduce swarming istict, which usually occurs in April. Usually, all that needs to be done is to mutuallty replace the boxes. As soon as good weather is on the brink, boxes can be restructured i.e. the uppore box in

which the eggs are located and the vast majority of the feed is going on the lower box, while the lower box replaces the upper one.

Swarming prevention can be performed in several ways:

- By adding honeycomb foundations for budding and expansion of the brood box and deep honey super. This will result in increasing the number of young bees who have an instinct to produce wax and to build new honeycomb foundations. This should be used for increasing wax production, which affects in reducing the swarm instinct with the bees.
- By limiting the queen's access to only one box, in order to increase production of honey.

There are opposite opinions when it comes to the queen's limitations to lay eggs. In practice, such approach has some results since by limiting queen's movements to only one box, leaves large space for storing honey. Furthermore, smaller honey quantities are used, and the swarming instinct is severely reduced. But, if the blooming period is extended and there's abundance of nectar, reduced number of eggs will result in reduced bees' number, so the production of the colony will significantly be reduced. In such case, limiting queen's movement is counterproductive.

3.6. Honey extraction

When the bees have filled the cells with honey, the keeper should start to prepare for honey extraction. It is important to emphasize that honey extraction is not a procedure that should be performed before the honey has matured. Too early extracted honey is more liquid, which makes it unattractive to the customers. On the other side this type of honey does not last for long as it can acidify and to become unusable for human consumption. Hence, frames which are not at least 70% closed, should not be extracted. One of the best ways to make an estimate is to have a frame out, shake it gently and if nectar drips are falling out, it's a sign that the honey is not ready to be extracted and should be left to mature. If opposite, means the honey is mature and can be used as honey in honeycomb foundations or to centrifuge. The empty frames should be returned back from they were taken, for further honey storage from other pastures.

3.7. Water

Water resources should be identified during the period when search for suitable location is undergoing. Yet, there are cases when these resources are running out of water, especially during drought. In such case the keeper must intervene by providing water-well. Maintaining the well

in regular shape is quite important. Most common way to provide enough quantities of the well with available water is to connect the well with a barrel in which fresh and clean water taps. Then lath extends from the barrel dubbed with a zic-zac line. But, best case scanerio is to locate a well which doesn't run dry.



Figure 12 – Watershead

4. PROTECTION OF BEES FROM PESTS & DISEASE IN ORGANIC WAY

In order to provide succesfull operation the keeper must pay attention to protect his bees from pest and disease outbreak, as these can case significant damage to his operation.

4.1. Protection against pests

There are a number of pests that cause losses to the bees in winter, such as various birds (woodpecker, booth) and bears. These enemies to the bees do most damage to certain bee colonies, unlike wasps, hornets, bee birds etc. which are fed with live honey bees and causing general damage to all containers of the apiary. The wax moth causes more damage, destroying the honeycomb of bees on which they live, and indirectly by serving as a vector carrying infectious material from the American decay.

4.2. Protection against wasps and hornets

In some years the attacks of wasps and hornets can cause huge losses in beekeeping unless appropriate measures are taken to protect the bees. Usually at apiaries beekeepers use plastic bottles filled with $\frac{1}{4}$ beer or juice. These lures are left on the covers of the hives and serve as bait for wasps and the hornets, which eneter in and die. There are also special traps for wasps that so far have proven to be most effective.



Figure13 – Effect of using wasps trap

4.3. Wax moth

The wax moth often affects frames within no bees. Causes harm by entering the boxes of frames with honeycomb and destroys it completely. If the beekeeper takes no action, pest damages and makes the frames unusable. Also wax moth enters in hives with bees, lays eggs in the narrow parts of the hive or between the frames i.e. parts that can not be reached by the bees. Thus disturbs the bees, they become aggressive than normal, but the danger is greater in terms of transferring infectious diseases..



Figure 14 – Wax moth damages

4.4. Bee diseases and remediation

4.4.1. Varroa

One of the most common disease that occurs on the bees is the Varroa. It is parasitic disease caused by the parasite *Varoa jacobsoni*, parasite with four pairs of legs which parasitize the body of larvae or adult bees, than drinking their haemolympha, which weakens the bees reduces their productivity and reduces their life span. At high infection rate it can lead to an attack on the entire bed, cannot be recovered by young bees that are commonly hatched with deformed wings, and the life of adult bees greatly diminished, resulting in weight loss and death of the whole family. A common occurrence is when the weakened colony leaves the hive and then dies.

If timely treated this disease in organic beekeeping will cause no damage. Its treatment should be started as early as the months of November or December. During this period it is advisable to use oxalic acid which if used properly. Mostly affects next year presence of the parasite which can be reduced to an acceptable level. In order to use oxalic acid in bee colony there should not be existence of beds, because the acid may damage it. Bees should be in winter club, and the temperature should be between 6 and 12 ° C.

Treated beehives with oxalic acid in spring do not need to have additional protect, except in cases that the beekeeper himself needs to evaluate.

To protect the honeybees during summer months from mite in organic beekeeping, there are more means of protection which itself may contain herbal extracts such as thymol, eucalyptol, etc. These are in the form of volatile preparations. They are just left in the hive or are entered through smoking, as is the case with various vegetable mixes or dissolved Thymol.

Also in the organic beekeeping use and formic acid, which may be administered in small trays that are positioned at the top box of the hive, the rubblet and under cover board. There are also special evaporators intended for metered evaporation of formic acid, which should work more closely in terms of protection and care of the beekeeper the bee family. To avoid unwanted health consequences, the beekeeper should avoid inhalation, and as protective equipment regularly to use rubber gloves and glasses.

In terms of protection of the colony it should always be used the recommended dose. It is very important in the treatment with formic acid, the air temperature must be above 26 °C. Before treatment, the formic

acid should be refrigerated in a freezer for at least 24 hours. This is because the chilled formic acid will not cause abrupt evaporation and shocking of bees. Failure to comply with the above may cause abrupt evaporation of acid in the hive, on which bees react with sudden evacuation and mostly losing the queen.

The same can happen if the bar in which the acid is placed, due to negligence spilled and poured into the crate. In this case, the beekeeper should open the chest and place the box in another box with sufficient ventilation to reduce the concentration of acid in the chest.



Figure 15 – Varroa

4.4.2. American foulbrood

An infectious disease that attacks the brood in which bee colonies weaken and eventually die. Transmitted from sick to healthy family most often when a sick family has died while healthy families robbed honey that is contaminated with the disease agent. Symptoms of the disease are odor that feels when you open the trunk, which resembles the smell of rotten cheese. Other symptoms should seek around the closed brood which is scattered and small, small openings are noticed incurred by the bees while taking out dead larvae, already under drab dark brown sticky substance. If touched, this shapeless substance if drawn backwards, it stretches for a few centimeters.

The disease can be cured, but for security reasons in the Republic of Macedonia such procedure is prohibited. The disease is not contagious to humans and if it is perceived, the Agency for Food and Wine should be informed in order to take sample for analysis. If diagnosed in laboratory, infected families are killed and beehives with honeycomb and bees are to be burned, as it would infect other healthy families.

4.4.3. Chalkbrood

The disease is less important than the previous two but in some years it may take a larger swing. It occurs in spring when the weather is rainy and colder than usual. A fungal disease and occurs only open bed which occur with larvae's dehydration, after which the bottom of the cell remains small bead-like lime, from which comes the name of the disease.

The treatment of this disease requires narrowing the bee habitat and feeding of bees with honey syrup made from tea wort (*Hipericum perforatum* and *Melissa oficinalis*) and lemon balm. The purpose of this narrowing and feeding them to the bees to clean all the cells in which there are dead larvae and to fill them with brass or queen solution to underpin eggs. Thus eliminate all dead larvae as a source of infection and royal family prodolchuva with spring development.



Figure 16 –Chalkbrood

Sometimes in the same weather conditions that correspond to the appearance of chalkbrood, can lead to spells of part of the bed of the side frames, in which case the bees eject the dead larvae in front of the hive larvae or mummies. This happens when the preceding warm period favorable for the development of the bees and the beekeeper had forced the colony with excessive expansion of the bed. Then cold weather came in with minus temperatures in the morning, causing the reforming the winter club. See Figure 17.



Слика 17 – Dead bees and larvae due to cold weather

5. BEEKEEPER'S CALENDAR

AUGUST

August is considered as the beginning of the beekeeping year, so Beekeeping calendar begins this month. What happens in the apiary in August are extremely important because of their timely and quality performance depends on the success of beekeeping throughout next year.

In most part of the Republic of Macedonia August is usually warm and dry month, but can lead to abrupt cooling followed by brief heavy rains. Morning temperature moving averages 14-20 °C and daily from 25-30 degrees. Heat waves are not favorable for bee communities. If it is too hot, it must always need to take measures to cool the hive and shade them.

Honey grasses and plants are still found in nature and in favorable years they produce nectar with varying intensity. During this period, if weather conditions permit, happens the blooming of “medlika” and the production of dark forest honey.

Bee families are tightening the laying space, while the queen reduces the intensity of hatching eggs. More honey surrounds the bed, forming the space in which the bee community winters.

For the present weather conditions in the Republic of Macedonia and the genetic potential of the Macedonian bee, for safe wintering and spring development of the bee communities it is necessary to provide 10 to 15 kg properly deployed mature honey per productive colony, and in some mountainous areas where winters last more even more honey quantities. If there is not enough feed in the hive, minimum required supplies need to be provided. If unfavorable weather extend queen can stop laying eggs, which quite adversely can affect the provision of sufficient winter bees.

In this case the beekeeper should make stimulating additional feeding of the bees or perform removal of bee communities in a location that provides a yield of nectar and pollen. The lack of sufficient number of preapraed for the winter period young bees is the biggest cause of winter losses in apiaries in Macedonia. The queen should be vital and functioning at least from the previous year. The bed should be homegenous without diversity or skipped cells.

Also, detailed check of the waste on the bottom draw may indicate the extent of infectance with varroa.

Make sure that the findings should also be noted in the log to determine further action to rehabilitate the poor and middle bee communities and communities with old queens and bad comb.

Poor communities should be joined to form semi-high or strong bee communities. The colony should be nursed if there is not enough honey. If in poor bee communities were identified some bee diseases, it is best that those bee communities to be destroyed. If stronger communities are infected, depending on the disease, take the necesarry measures of treatment or destruction. For diseases in bees there is appropriate literature and manuals described method of detection diagnostics. Treatment of diseases in organic beekeeping should always be in the company of an expert or experienced beekeeper, using exclusive techniques and materials allowed in organic beekeeping.

SEPTEMBER

September is the second month of the period when the bee community is preparing for winter period. Autumn is already on the doorstep and the weather is colder

Precipitation can be frequent. The temperatures are about 20 °C. Pashture possibilities are less and bee community has narrowed the space where the bed would form the winter clube.

In the third decade, the bed is quite small and in occasions the queens stop laying eggs.

For the beekeeper the primary task in the first half of September is to check for existence of quality bed. That can be achieved by the presence of young queen, which lays slightly longer than the old queen.

The hive should contain the necessary amounts of feed to be located over the place wherever the club is located and that's where last litter is

The colony in Langstroth hive which have already passed the stage of a young company and pulled over 20 frames with honeycomb, should be prepared for wintering with filled two boxes.

Weak colonies should not be left alone to welcome the winter period. If they are healthy, it is necessary to be merged with semi-strong and strong communities.

Protection against robbery of bee colonies in this month is very important and the fact that poor bee communities can not provide sufficient protection at the entrances of their homes and may become the prey of the stronger communities, but by the wasps and hornets as well. Therefore, during summers weaker bee communities are required to be narrowed.

If there is a colder weather mice can enter into the hive. To prevent this case, during summer months the bottom board should be adopted for winter conditions or simply to install a comb.

September is the month that should actually slowly end the active season and slowly to prepare the bees for the harsh winter conditions. Activities related to arranging the hive providing food and superb honeycomb, mergers etc., should be completed this month.

We should always bear in mind that sudden low temperatures are possible in this month for which required activities need to be completed on time.

OCTOBER

October is the month in which the temperature beginning to drop significantly. Precipitation is more common.

In some years first frosts become apparent followed by weak snowfall. There is little to be collected by the bees or there is nothing at all. Bee community slowly forms its winter club.

October is the last month of the period of preparations for overwintering by the bee community. The queen has already stopped to lay eggs or lays quite minimum number, last bees are hatched or not hatched at all, end frames are filled with honey and pollen, and over already formed club has a thick garlands with folded honey and pollen in the immediate vicinity of them. In the lower part are empty cells of the honeycomb of the bees that winter. If they are darker it is a sign that in that honeycomb several generations of bees were hatched. It is a honeycomb which appears lighter on light.

During this period all unnecessary holes of slates, the walls of the hive and cover board are covered with propolis and bee community is preparing to submit the harsh winter climate.

NOVEMBER

November is the first month of the trimester (November, December, January), when the bee community is at a standstill.

In November the weather is already quite cold and the bees in the club are spending quite small of energy and food, saving it for spring development.

Nature in some years is under snow and ice can surprise by freezing the melted snow at the bottom board.

Bee community is at stationary. The checks in this month are not recommended except in some exceptional cases.

Beekeeper in this month does not some extensive work if abided by the instructions and all major works has been completed in October. Yet the presence in the apiary by the beekeeper in this month is of great importance.

Ventilation should always be checked. It should work well, because it is a prerequisite for good winter vacation.

Fensed beehives are always is advantage because many small disturbance of small animals, cattle and wild animals can occur. In a word, beekeeper in November need to constantly monitor the apiary providing complete peace.

In this month all colonies shloud be treated with oxalic acid.

DECEMBER

December is the month in which the winter steps forward in a form of heavy snowfall and low temperatures.

The nature is at stsandstill, so are the bee colonies formed as a club, position which enables easier survival durig low temperature period.

This is the second month of the standstill period for the bee community. There are no intensive activities in the apiary, but that does not mean that the beekeeper should not have controlling visits. On the contrary, he should constantly supervise apiary and intervene in cases when it is necessary.

Special attention should be given to:

- frequent defecating flight taken by the bees. If on sunny days the bees are massively going out and returning back to the hive, not spending much time of the bottom board, while on the hive walls there are no spots of bee feces, it says that everthing's in order with the colonies;
- hive position and their stability. They shoul be slightly bended forward, to prevent moisture penetration.

- The level of protection against rodent entrance and ventilation should always be under control
- Protection against cold winds should be taken into consideration, as it influences feed expenditures within the hive.

If the above conditions are met, in the temperature frame from 0° – 5°C, and provided full peace for the bee family, this month consumes small amounts of food.

It is necessary to know that the bee community to move to the basket from one street to another requires a minimum outdoor temperature of + 8°C. On this temperature the club temporarily disbands taking the new position. But if the low temperatures continue over several weeks, the bee community cannot move itself closer to the honey and dies of hunger, regardless the fact that the basket has a fair amount of honey.

December is the month in which results of the previous year are summed up and preparation plans for the development of the apiary in the coming year are taking place. Now that the high season is behind us, we have enough time to look at data from Beekeeping diary and analyzing the most important problems by adopting a plan for rapid spring development of bee colonies increased possibly moving, etc.

The yields are not supposed to be expressed only in honey, but in other bee products and swarms as well.

JANUARY

January It is the month that ends the period when the bee family rest. January is usually the coldest month of the year with very low temperatures that can sometimes drop down to more than -20 °C.

But there are years when January temperatures are relatively high compared to the average for that time of year and can reach up to 14 °C and more. It is these fluctuations in temperature are real problem for the bee community. Bee clubs at high temperatures expand, and shrink at lower, thus consuming larger quantities of food and energy.

The brood in this period covers a small area and which creates new young worker bees. And growing it to spend reserves of honey and it is better if the queen bees at this time lay brood on smaller area.

If freezing temperatures in December did not allow the bees to have defecated, the bees are accumulating in their bowels large amounts of indigestible substances. Their abdomen is visibly increased.

That means that a cleansing flight in a warm January day is very important, so the bees would be releasing indigestible substances, thus becoming lighter and more resistant to low temperatures.

If you notice the massive and vigorously flying off bees without locking the summers, it is a sign that the bee community is healthy and winters well.

FEBRUARY

February is the month in which the temperature is slowly elevated and in some years in some sunny days reaches up to 18 °C . This month abounds with temperature differences that are affecting the development of the bee community. Despite the snow, first plants are slowly beginning to bloom, from which the bees are getting nectar and first flower powder. During this period followed by hazelnut flowers whose flowers are rich with flower powder. As nature awakens so does the bee community. Although still in the club stage, the colony slowly raises the temperature in the hive and in the center it reaches about 31 degrees. The queen slowly starts to lays eggs and the bee community enters into an active phase. Cells are cleaned for bed preparation and if outside temperature is favorable, the bed quickly spreads.

MARCH

March is the month when several trees start bloom: elm, dogwood tree and other plants that bloom profusely, offering large amounts of pollen. Bee community has been for long in active phase consuming more honey and pollen, already present in nature.

This is the second month of the period of development of the bee community and the beekeeper needs to perform a series of significant interventions and activities of the apiary. For this month valid is the conclusion that if something is missed now, cannot be compensated later. Moreover, it is a known fact that the full basket of bed in second half of March fills the honey storages in the hive.

This means that March should intensively stimulating the bed growth and the development of the colony.

APRIL

Temperatures in April stabilize at the average, ranging from 16-22 °C. Climate and development of nature positively influence the development of the bee community. Hives in April are extensively filled with bed and bees.

In April bee community should be fully developed and ready to accept honey and seize resouces from the main grazing.

In this month, the plans for production of queen bees are prepared

while the bee communities which will participate in the production cycle should intensively start to prepare.

Despite the constant mentioning of intensive development, we still need to have in mind the possibility of creating a swarming bees, and if noticed we should take all necessary measures to prevent it. At this time of year, if plant honeying is in abundance, the queen becomes blocked in laying eggs, there is large number of young bees and the instinct to swarm prevails. In fact it is a natural instinct for breeding. But it is also one of the biggest problems for beekeepers and beekeeping in general.

MAY

May is the first month in which the colony is on its way to reach the peak of its development. On the other hand, the beekeeper should use the potential to produce queens, swarms, honey, pollen and wax. First nectar resources appear in this month, which will enable honey extras for centrifuging.

Nectar in abundance stimulates the queen, she increases laying activity and fills greater number frames with hatches. The colony grows intensively. If the hive is not expanded on time, it becomes overcrowded, the temperature is on the rise, young bees are jobless which stimulates the swarming instinct.

Adequate ventilation is especially important throughout the year. In this month, the ventilation should be at maximum, the bottom board should be fully available.

JUNE

June is the second month in this trimester in which the colony reaches its development maximum. In June, there's a peak of blooming plants, and conditions for collecting nectar are optimal, the soil is warm, there's enough humidity in the air, while relatively warm nights and mornings with dew contribute to the prevarable conditions for the plants to secrete nectar. There pollen in abundance as well.

In June, the weather is stable, and the temperatures are between 18-24 °C. However, there are variations related to the temperature which can often go above 30 °C, and to drop below 10°C too. These shocks can provoke the plants to stop secreting nectar, which will result in lower yields, and will jeopardize colonies survival. Still, optimal average daily temperatures are between 18-24 °C for the plants to attract the bees,

Precipitations can have local character, which has to be specially under consideration during colonies transfer. It is to be known that heavy

rainfall has negative impact over the plants, when it comes to nectar secreting. Winds are not welcomed in June, since they tend to dry the flower and the nectar and are shortening flowers life span.

Several plants are blooming in June: meadow grass and lime, chestnut and many herbs.

The life of the bee is closely connected with the life of plants and blooming, because their main food is nectar and pollen they collect from the flowers. So in June, bees have an abundance of food and in favorable year for their development there are occurrences of swarming.

Beekeeper in June must take a series of actions to stabilize the situation of the apiary.

This month is suitable for forming artificial swarms.

JULY

July is the last month of this period when the bee community reaches the peak in its development. The apiary situation is beginning to stabilize.

In July, daytime temperatures over the 30 °C and sometimes over 40 °C. These high temperatures, if there is enough moisture in the soil can be in favor of producing the plants' nectar secretion. Warm nights also allow a number of grasses to secrete nectar in abundance. This month is also favorable for secretion large amounts of nectar on lime and sunflower.

Bee community still maintains its optimal number, but queen laying half of this month begins to reduce the number of hatched eggs and the number of frames with brood begins to decrease.

Although the beekeeping season still ongoing, while entering the summer grazing season it is time start thinking about the beginning for the preparations for the next year.

Therefore, in the third decade of July preparations for a review of bee communities are already in progress.

One very important thing that needs to be finalized in July is the protection of bee communities from the high temperatures. This is especially popular in recent years when June temperatures become unbearable, and if the bee hives is a dark color, can easily overheat.

Despite the huge efforts by the bee community to maintain the required temperature of about 31 °C, the colony fails to achieve so hive overheats, which leads overheating of the brood and inability to bring healthy and vital bees. Usually in such situations bees leave the hive forming large black beards on the openings.

It is therefore recommended the hives to be painted with a light color, the ventilation open to the maximum and apiary to be positioned in a shade, and during afternoon hours to be completely overshadowed. If the apiary has no natural shade it should be overshadowed with straw, hay, cane branches, but can also be used cartons, etc.

In dry years, especially in the second half of this month damages may occur from wasps, hornets and many other pests. The fight against them is significant.

A stylized sun graphic with a central circle and radiating lines, set against a background of concentric circles and a color gradient from dark brown to light orange.

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