



# The proper feeding of bees.



A guideline for  
successful beekeeping.



  
*Bee feed from Nordzucker*



# Power food for your hardest working bees.

With ambrosia®, your bees will enjoy food of the highest purity and digestibility. Because ambrosia® is a ready-made sucrose-based food it is easy to use and has a long shelf life. Because it is odour-free it is also completely safe from predators.

## ambrosia® Syrup

- Comes the closest to natural bee feed
- Guaranteed hassle-free acceptance by the bees
- Ideal for early and late winter feeding

## ambrosia® dough

- Its micro-fine sugar crystals can be easily ingested by bees
- Optimally suited for feeding during lack of honey flow
- Best suited for queen breeding in multiple frame mating nucs and one frame mating nucs

We will gladly answer your questions and provide you with the name of a specialized dealer in your area:  
Nordzucker AG · Küchenstraße 9 · D-38100 Braunschweig  
Tel. +49 531 24 11-134 · Fax +49 531 24 11-197



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We look forward to your questions, suggestions, and comments.

Braunschweig, January, 2014

## Introduction

In light of the impacts of climate changes and extensive farming it is even more important today than ever before to provide beekeeping with a secure, and promising, foundation through a combination of measures. The following goals apply based on regular monitoring of the apiaries and good beekeeping practice:

- Securing sufficient food supplies
- Strategies for maintaining good health (priority: consistent control of the Varroa mite\*, minimization of the risk of infection)
- Use of younger and productive queens
- Creation of a hygienically immaculate honeycomb
- Forming strong winter colonies



\*) The Varroa mite has become a serious problem for beekeepers. A reliable, individual approach is necessary in order to be a successful beekeeper. One treatment per year is not sufficient, 5 or 6 will not be tolerated by the bees. 2 or up to 4 summer treatments and 1 winter treatment offers the best guarantee for healthy and productive bee colonies according to the latest findings.

Below you will find my approach with which I have gotten the Varroa problem under control:

- 1) consistently cutting out the drone brood
- 2) At the end of May/Beginning of June removal of all covered brood combs without bees
- 3) leave a trap comb with eggs and the youngest larvae in the colony and then remove, without fail, after 10 days
- 4) perform a treatment after end of breeding in November
- 5) Monitor treatment result.

Feeding essentially determines the success of the coming bee season. Mistakes are very difficult to correct.

At no time a bee colony should be exposed to a lack of food. Regardless of the feed stocks a shortage already exists if the supply of food is interrupted.



**Lack of food** quickly leads to a reduction of brood activity, cleaning operations, and pollen collecting with negative impacts on the quality of the nurse and winter bees. As a result they suffer under losses in vitality, resistance, and longevity. The impacts are also displayed in economic terms.

If the fodder reserves in the bee colony approach the 5 kg mark and the food supply from the outside runs dry, a shortage begins. Bees are then no longer able to counteract and suffer from hunger. If the last feed remains are used the starvation already begins 24 hours later and after just 48 hours the colony is dead. Recognizing a shortage and taking countermeasures in time is the first priority of the beekeeper. Far more bee colonies die of hunger in Germany than of the universally feared bee diseases.

However, an **ample supply of food**, which ideally is aligned with the bee's special requirements, promotes and ensures a vital bee colony and thus creates favourable conditions for successful beekeeping.

The minimization of

- losses in energy during feeding and digestion
  - stress due to the intrusion of the beekeeper
  - risk of infection due to parasites from other hives in the case of robbery
- has a positive effect on the welfare of the colonies and promotes the honey harvest.

## Physiological requirements of the bees

Honey, pollen, and water ensured the survival of bees for over 30 million years

– As a result of environmental changes, the encroachment of beekeeping, the impacts of diseases and pests as well as higher demands on the bees it is more necessary than ever to have diligent care, and optimal food qualities.

Adequate beekeeping through protecting their health (primarily combating mites), and feed supply (guaranteeing pollen and nectar sources, feeding during forage gaps) are decisive for healthy bee colonies. In contrast, e.g. inherited impacts on longevity are of lesser importance.

Bees are quite demanding with regard to feed quality. Any limitation of the feed in the form of a sugar spectrum which is not ideal, and is of insufficient composition, must be avoided.

Sugar based bee feed like ambrosia® bee feed products have been used for over 40 years as an economic replacement for a lack of honey flow.

### Bee feed must possess the following requirements:

- Lowenergy costs and ideal digestibility
- Maximum use of the nutritional value, free of harmful ingredients
- Optimum formulation in standardized quality
- Easy to use (Storage, dosing, ready-to-use)
- Odour free to prevent robbing
- Shelf life (long minimum shelf life, biological stability)



## Feed alternatives

The natural supply of **pollen** is the foundation for brood care and health – it is essential to place bees in a appropriate landscape to insure a good pollen supply. Bees need natural pollen variety because not every type of pollen contains all the necessary components of food. A single pollen source always has a negative impact on the immune strength and vitality of the colonies. Sooner or later the combination of lack of pollen and Varroosis always means the death of the bee colonies affected. After wintertime the pollen supply in the spring is of vital importance for positive development and in late summer for the development of the fatbody of the winter bees. In the event of a lack of pollen a change in location should be made.

The pollen requirements of a bee colony is between 30 and 50 kg. Stockpiling pollen combs, is a good opportunity for later providing against a lack of pollen, particularly during the regularly, overabundant supply during the rape blossom season. What a lack of pollen results in is illustrated again and again by the dwindling of the colonies during the honeydew honey flow in the sprawling spruce and fir forests of the Central German Uplands as opposed to the heather blossom in the North. Often the heather honey flow fails; however a good pollen supply can lead to the development of a well supplied, healthy winter colony. Pollen substitute (i.e. soy pollen, skim milk powder) is never an alternative to freshly collected pollen from nature. The physiognomy of the bee is not adapted to the structure of the pollen substitute. Albumin remains in the bee's intestines and forms an ideal breeding ground for the development of nosema.

Apart from their own use bees need **water** for preparing the jelly, for feeding the brood, for dissolve food with low water content , and cooling the hive temperature on hot summer days. Water is not stored by the bees. For this reason a hygienically, impeccable water supply within easy reach must be ensured, particularly in the spring, when the bees often can only fly away for less than an hour a day. Naturally, the water reservoir should be a sufficient distance from the entrance hole. Water in a slightly acid pH range with a pH value between 5 and 6 is preferred by bees.

**Honey** as a natural food supply is physiologically unrivalled. In the months of April through June the daily requirements of a colony is on the order of 500 g. However, as a winter food, honey is mostly unsuitable: forest and heather honey are too rich in minerals and fibre which can lead to dysentery. In order to avoid foul brood when honey feeding one should only fall back on one's own harvest, because in addition to pollen, honey, can be a carrier of pathogens. Naturally, the high selling prices recommend another use for honey and therefore the economic ready-made food.

**Sugar water** was for many years the classic form of bee feeding. The advantage of its ease of manufacture is countered by the disadvantage of a limited shelf life. Because of the risk of spoilage through microorganisms, rapid application must be observed already during its preparation, and during feeding. Sugar water that has formed a film should not be used for any further feedings. In comparison to sugar water bees rework thicker solutions such as ambrosia® bee feed syrup with a significantly lower energy expenditure because the glands do not need to work as hard for inversion.

Alternatively, beekeepers also prepared feed doughs made of powdered sugar and honey; however this is very labour-intensive and expensive.

By collaborating with beekeepers and researchers, Nordzucker developed special, ready-to-use syrup and dough products in the 1970s which were oriented towards the optimal sugar type spectrum of honey, and based on the purest beet sugar. Since then these have been distributed across Europe under the brand name ambrosia®. The use of refined sugar in certified production processes ensures premium product qualities. The formula is free of harmful ingredients.

## Ready to use Products

**ambrosia® bee feed syrup** is a liquid ready-made feed with a balanced sugar type spectrum (fructose, dextrose, sucrose), based on beet sugar of the purest quality. The high percentage of fructose and lower portion of glucose prevents the formation of crystals in the honeycombs. The high sugar concentration makes the syrup resistant to microbiological decay. The ideal combination of the sugar type spectrum ensures the bee's optimal use of the nutritional components. The nutrient concentration is approx. 72.7 percent. 1 kg (or, 1 litre) ambrosia® bee feed syrup is 0.73 kg (1 kg) sugar crystals.

ambrosia® bee feed syrup is particularly beneficial in the early and later winter feeding:

- its formulation comes the closest to natural Bee feed,
- effortless acceptance and utilization-less inversion work needed,
- conserves the bee's energy balance. Tests showered energetic advantages on a scale of 15 %.
- High resistance to microbiological decay leads to longer shelf life
- Hygienic, time-saving, and practical handling

To avoid robbing liquid food should only be offered inside the beehive-it is important to avoid spilling the food on the beehive. Whenever possible, feeding should be done in the evenings.

A wide range of containers ensures the varying needs of the beekeepers are met:

- ambrosia® bee feed syrup can be obtained
- loose in tank trucks
- and in the following disposable containers:
- 1360 and/or 870 kg **palette containers** (IBC)
  - 160 kg **keg**
  - 28 and/or 16 kg\* **cubitainers** (refill packs)
  - 14 kg **pail**
  - 12.5 kg **canister**

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Uptake tubes for the 16 kg cubitainer can be obtained at your specialist retail supplier.



**ambrosia® bee feed dough** is a paste-like compound made of micro-fine sugar crystals, which are surrounded by a syrup film made of different types of dissolved sugars. The syrup prevents the crystals from being encrusted and enables easy acceptance by the bees. Because of its low water content, ambrosia® bee feed dough has a shelf life of 24 months in ideal storage conditions\*.

The product can be purchased in the following packaging options

- 15 kg-**carton** with inner film
- 2.5 kg-**portion-sized package** (PE-packs with film in a 5 pack outer carton)

We especially recommend the portion-sized packages with their practical handling benefits.

Feeding with the dough is extremely easy: the 15 kg packet is removed from the cardboard box with the foil and laid on the frames open side down, or portioned out as needed. The foil prevents the dough from drying out.

Using the 2.5 kg packet, an approx. 2 cm wide slit is cut into the long side. This enables a daily removal of 400 g over a period of 7 days.

\*) **Storage** should take place in a dry space in temperatures at an ideal cool level of between 10 and 17 °C. Drastic changes in temperature should be avoided.

The following periods of time are provided for the **shelf-life** (BBD):

|                                       |           |
|---------------------------------------|-----------|
| Bee feed syrup in original packaging: | 18 Months |
| Bee feed syrup, loose:                | 12 Months |
| Bee feed dough:                       | 24 Months |

The integrity of the packaging is a prerequisite for these shelf lives. Opened packages should be used promptly.



## Occasions for feeding

### Maintenance feeding

In springtime sunlight, the increasing temperature, and the supply of pollen are the engine and the impetus for the rapid growth of the bee colonies. Food must be abundant just as a plentiful winter feeding. As a general rule nature does not always provide a sufficient nectar flow in early spring. If food is not available in abundance a feeding with ambrosia® bee feeding syrup should be performed as a precaution.

### Emergency feeding

The need can arise at any time of the year and it must be performed immediately. As an immediate measure 0.5 L ambrosia® bee feed syrup tempered at body temperature should be distributed in the spaces of the honeycomb. After 2 hours the bees will again be mobile. An emergency situation always comes with a setback in development so that even economic losses cannot be ruled out. In the winter one removes the empty combs close to the winter cluster and fills the holes with heated feed combs. If these are not available a feeding must take place with heated ambrosia® bee feed syrup using food pockets. It is important that a food store of at least 5 kg (this equals three full honeycombs) is achieved. In early spring a re-feeding is essential in favourable weather conditions.

In the summer in the event of still outstanding flow, an emergency feeding can take place with only a honey solution, or honeycombs, in order to rule out a later honey adulteration.

### Forage gap feeding

Here, honeycombs from well stockpiled colonies, or weekly dispensations of ambrosia® bee feed dough in 2.5 kg portion packages help during the critical phase until the restart of the honey flow.

### Feeding of nucleus colonies

Nucleus colonies are the guarantee and the reserves for the coming season. For example form 5 to 7 comb nucleus during the rape blossom season, which are well stockpiled with food and pollen. During the nectar flow it is not necessary to feed the nucleus, otherwise they should be supplied every 8 to 10 days with a portion-sized package of ambrosia® bee feed dough. This is labour-saving and the development of the young colonies moves

forward quickly due to the constant stream of feed. With corresponding care and expansion with new combs the nucleus colonies will occupy two hive bodies with 20 combs by the end of July.

The feeding in fall should already start at the end of July with ambrosia® bee feed dough. Only well supplied nucleus colonies with a suitable queen will bring their full capacity in the next year.

### Breeding

3 to 6 weeks before initiating breeding the nurse colonies are prepared. A good supply of pollen and food is extremely important for those nurse colonies. The optimal supply of nurse bees with food is one of the most important requirements in order to ensure good acceptance of the queen cells and care of the queen larvae.

### Feeding the winter feed supply – 3 variations

Depending on the operation and the requirements of the beekeeper the following variations are offered:

#### Variation 1: with ambrosia® bee feed dough

A 15 kg packet of ambrosia bee feed dough is administered. To this end remove the cover of the outer packaging together with the overlying foil and place it on its head so that the removal surface lies on the frame directly over the bee's nest. Cover with an empty body and cover. When after 10 to 14 days the dough is consumed a half a package is added on. Together with the 3 kg honey supply left from summer time, the colonies have received their full quantum and are prepared for winter around the 20th of August. A later re-feeding should be done using only ambrosia® bee feed syrup in order to treat the winter bees with care. The big advantage of this variation lies in the long, sustained food stream and in the economy of labour.

The result is optimally nursed, unburdened, and well developed winter bees.

**Variation 2: with ambrosia® bee feed dough and syrup**

As described, initially a whole package is handed out; the dough feeding works more favourably physiologically than the liquid feeding does on the quality of the resulting winter colony. From the end of August to the beginning of September the remaining missing amount is supplemented with 8 to 10 litres of ambrosia bee feed syrup.

**Variation 3: with ambrosia® Bee feed syrup**

Colonies, which have been used for late summer and early autumn honey flow, needs sugar syrup as a feed. The syrup develops its advantages in the form of its favourable formula and its low expenditure of energy for food adaptation in late summer / autumn feeding for stressed, heavily burdened winter bees, which require a particularly gentle treatment.

This late winter feeding takes place during the time period from the 20th of September through the middle of October. With 17 litres of syrup the bridge to the early honey flow in next spring can be easily reached. Tests with sugar water (3:2) and ambrosia® bee feed syrup showed that the colonies fed with ambrosia® bee feed syrup could end the intake, processing, and capping of the winter food 3 to 6 days earlier.

Overview: Suggestions for use of types of bee feed.

| Reason                   | ambrosia®<br>bee feed syrup | ambrosia®<br>bee feed dough |
|--------------------------|-----------------------------|-----------------------------|
| Filling the forage gap   | --                          | √√                          |
| Winter feeding (early)   | √                           | √√                          |
|                          | √√                          | --                          |
| Nucleus colonies feeding | √                           | √√                          |
| Breeding of queens       | --                          | √√                          |
| Emergency feeding        | √√                          | --                          |



## The cycle of the bee year – Monthly overview

### March

The decisive factor in the rapid upward development of bee colonies is the largest possible survival of long-lived and unspent winter bees. An ample food stockpile by means of a well measured winter feeding, a high quality and rich pollen supply, increasing daytime temperatures, and a hygienically impeccable honeycomb construction with sufficient empty cells for breeding are the best conditions for optimal development. In the event of a shortage of food, food combs, or a feeding with ambrosia® bee feed syrup, which is not very labour intensive for the bees, helps. The bee colony will attain, at any cost, a harmonious and optimal upward development, in the spring. Every disturbance should be avoided at this time of the year—each intrusion brings one day of loss in development.

### April

During this time, the food stores decrease especially quickly. Unfortunately this is not easily discernible from outside because the increasing weight of the brood and the decreasing weight of the forage balance each other out. For this reason a regular visual inspection is an absolute must until the fruit blossom, in order to counteract any deficiencies which may arise in a timely manner. It is also important to begin with the reduction in Varroa mites while the drone brood is cut out.

### May

If the beekeeper has done everything correctly the bees will show what great achievements they are capable of if well taken care of. The focus is the periodical swarm control. Now is the time to build the young colonies for the next season in order to ensure health and strong replacement potential. The cutting of the drone brood should be consistently pursued in order to impede the reproduction of the Varroa mite. The one-time, and complete, removal of the covered brood without bees for the formation of new colonies guarantees, as a result, healthy, low parasitized bee generations who are capable of building up long-living winter colonies on their own.

### June

In the last honey harvest from the early nectar flow large food reserves should be left in the colony in order to avoid deficiencies in the event of gaps in the nectar flow. If the flow runs dry a 2.5 kg portion-sized package of ambrosia® bee feed dough should be given with the weekly feeding, at the latest 4 to 5 days after this occurs, as a stop gap measure. To avoid adulteration any contamination of the honey must be prevented.

### July

The bee year has passed its peak and the colonies are slowly beginning to prepare for the winter. There are still a lot of bees, but less and less honey flow. After the last honey extraction at the middle of the month begin feeding with ambrosia® bee feed dough (here we recommend the 15-pack) promptly in order to ensure that the bees maintain their care of the brood, and that there is no danger of robbery. The feed removal will take about 14 days.

The feed dough preoccupies the bees; it distracts them from the expulsion of the otherwise no longer necessary summer bees. In that they process the dough, are motivated to gather pollen, and get the water, they only contribute to preserving the health of the colony, and look after the winter bees, which are so important to the future of the colony. This, in turn, benefits spring-time development. With the conclusion of the honey harvest the infestation inspections and corresponding Varroa treatments should be initiated.

### August

Consistent cutting of the drone brood pays dividends. The beekeeper who has removed the entire covered brood once from the colony fares even better. Infestation with the Varroa mite is low, and the bees tend to be healthier and more energetic. Only the nurse bees, which are healthy and unloaded, are capable of raising winter bees with good fat/protein bodies.

The decline of the size of the colony to its optimum winter size moves forward. Weaker bee colonies should be combined.

### September

If the food stores still amount to less than 20 kg (in case of two-bodies overwintering), this can be secured by giving ambrosia® bee feed syrup. In case of one-body overwintering 1 l of syrup per normal size comb should be fed. The last of the winter bees hatch towards the end of the month through into October. They must manage to get fresh pollen to provide themselves with the necessary fat/protein cushion. Winter bees should not carry out any brood care because this would significantly shorten their lifespan. Colonies that continue to breed seldom live through the phase between hibernation and the beginning of fruit blossom. For this reason a longer break in the winter brood should be kept from mid-October through the end of January. In addition, this reduces infestation with the Varroa mite.

Thorough inspection for Varroa infestation is a constant and essential task. Without countermeasures the number of mites doubles every three weeks.

A Varroa mite treatment must be conducted quickly and consistently two, or three, times per year; only then can it be ensured that a sufficiently large number of the mites will die off so that the bee colonies can continue to survive. We do not recommend doing only one treatment, varroasis and viruses will be the result with qualitative and quantitative losses in the colonies. Due to the great strain on the bee colonies we absolutely do not recommend more than three Varroa treatments. Also, special attention should always be paid to the correct dosage when using medications after the last honey harvest.

Crucial conditions are created with ensuring abundant food supply during the forage gap and the winter feeding, for energetic and robust bee colonies and guarantors for successful honey harvests. Periods of hardship endanger the bee colonies and the honey harvest. With the diversity of the ambrosia® products beekeepers are given a helping hand with successful, user-friendly, and economically priced bee feed alternatives which give the user more time for other important tasks in beekeeping.

Sound knowledge of the connections between bee colonies and the impact of external factors is becoming more important. This manual is intended to provide a contribution in this regard.



## 10 important points to start the annual bee cycle

1. With the end of the nectar flow starting July 20th the breeding activity must be held at a high level using an adapted maintenance feeding (preferably with ambrosia® bee feed dough).
2. A Varroa infestation inspection and the reduction of the mite population must be involved. In doing so, watch for possible reinvasion.
3. The "old aunts" in the bee colony should take care of the food preparation after their work.
4. The larvae must swim in the larval food.
5. Beginning in September a brood nest expansion is not possible using a feeding.
6. The winter bees must still be able to fly out in order to build up the necessary fat-protein body.
7. Winter bees begin to age as soon as brood care work, or other glandular work, such as food preparation, must be borne.
8. The aging process of the winter bees should be delayed through the longest possible break in brooding.
9. Beginning in mid-August only feed with ambrosia® bee feed syrup which through its inversion, and its formulation, which is optimally adjusted to the needs of the bees, only very slightly burdens the bees.
10. By the end of August the stockpile of a strong and healthy bee colony should not go below 20 kg of winter food.

### ambrosia® Bee feed syrup



**Canister**  
Art.No. 17001072  
12.5 kg



**Plastic pail**  
Art.No. 31407  
14 kg



**Cubitainer**  
Art.No. 31414    Art.No. 31409  
16 kg        28 kg



**Keg**  
Art.No. 31415  
160 kg



**Pallet Container**  
Art.No. 17001384    Art.No. 17001005  
870 kg            1360 kg



**loose/silo vehicle**  
Art.No. 31410

### ambrosia® Bee feed dough



**Carton**  
Art.No. 37237  
15 kg



**Single-portion package**  
Art.No. 37298  
5 x 2.5 kg

**ambrosia®  
Powder**

**bag**  
Art.No. 4799  
10 kg



*Bee feed from Nordzucker*