



Apiculture Factsheet

Ministry of Agriculture
<http://www.al.gov.bc.ca/apiculture>

Factsheet #411

POLLEN SUBSTITUTES AND SUPPLEMENTS

The presence of pollen in the hive is of critical importance to the health and well-being of the colony. Brood rearing is synonymous with colony development, since pollen is the principal protein source for bees. No matter how good the queen is, inadequate pollen supplies will prevent brood development.

The amount of pollen required to raise one bee is estimated at about 10 loads. A strong colony may rear as many as 200,000 bees over the course of one year, which would require 2,000,000 pollen loads or about 20 kg (45 lbs) of pollen. As a rule of thumb, one kilogram of pollen is needed for every one kilogram of bees (9,000 - 10,000 bees).

Pollen production by a colony varies and in many areas it may be insufficient. Colonies experience pollen shortages most frequently in late winter / early spring, when brood rearing has started while pollen sources have not become fully available yet. To ensure large bee populations during the primary nectar flows, beekeepers stimulate brood rearing through supplemental feeding from early spring onward. Supplemental or substitute pollen feeding has become a standard management practice in commercial beekeeping. This type of feeding may also be applied during periods of pollen shortage throughout the production season.

Many different formulations have been developed for supplemental feeding. Even among pollens, there is considerable difference in food value. To illustrate the difference in quality, colony brood rearing was assessed:

Pollen Formulations	Avg. no. of bees produced / colony
Honey alone	575
Honey + soybean flour	2,600
Honey + soybean flour + 12.5% pollen	4,900
Honey + soybean flour + 25% pollen	5,500
Honey + soybean flour + 50% pollen	7,300
Honey + cakes of pollen alone	8,600

Please note that a **pollen substitute** is a replacement of pollen while a **pollen supplement** is a formula that also contains natural pollen.

Collecting Pollen

Ideally, pollen should be collected from one's own disease-free colonies. Pollen traps can be purchased or constructed (plans are available from equipment suppliers and the Apiculture Program office).

Purchasing Pollen

If pollen is purchased, it may contain diseases, e.g. spores of American Foulbrood. It could also contain other organisms, such as beetles, moulds and insects. To prevent disease introduction, the pollen should be irradiated before use at the Iotron Irradiation Facility in Coquitlam. If irradiation is not possible, the addition of antibiotics (oxytetracycline) in the supplemental feed is recommended. For correct dosage, please follow label instructions.

Ingredients of Pollen Substitutes and Supplements

There are various pollen substitutes and supplemental feeding formulas commercially available. The most common ingredients include:

- a) **Brewer's Yeast** - This product is readily available in small and large quantities. Brewer's Yeast is very similar in protein content to the average pollen, and is superior in vitamins.
- b) **Torula Dried Yeast Type S** - This product has been used for a long time in the United States, often in combination with soybean flour and Brewer's Yeast. Torula Dried Yeast may not be readily available in BC and then only at high cost.
- c) **Soybean Flour + Dried Brewer's Yeast** - This involves a mixture of soybean flour with Brewer's Yeast. The soybean flour has about 50% protein content. It should be of low fat content (5%-7%), manufactured through the 'heat treated expeller' process. The addition of dried or frozen pollen will make the mixture more attractive to bees. Casein and egg yolk powder may also be beneficial.

Preparation of Patties

Patties should have the right consistency, i.e. the mixture should not be too hard or runny.

Prepare patties as follows:

- Mix dry ingredients thoroughly.
- Mix a heavy syrup of 3 parts sugar to 1 part water.
- Slowly add 2 parts of syrup to 4-5 parts of **dry mix** (see formulations below), while kneading.
- Leave overnight and knead again before flattening into a 1.5 cm cake.
- Cut into squares weighing about 0.5 kg (1 lb).
- Place on wax paper and cover with another wax paper to prevent drying.

A. Dry Mix Pollen Supplement Formulations

In supplement mixes, the percentage of pollen can be increased or decreased depending on availability.

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| #1 | 3 parts soybean flour
1 part pollen |
| #2 | 4 parts Brewer's Yeast
2 parts dry sugar
1 part pollen
2 parts <u>lighter</u> sugar syrup (2 sugar : 1 water) |
| #3 | 10 parts Torula Type S Yeast
10 parts Brewer's Yeast
1 part pollen |

Note: use 2 parts dry mix to 3 parts syrup

B. Dry Mix Pollen Substitute Formulations

- #1 soybean flour only
- #2 4 parts soybean flour
 1 part Brewer's Yeast
- #3 10 parts soybean flour
 6 parts casein
 3 parts Brewer's Yeast
 1 part egg yolk powder

In each case, add 4-5 parts of the dry mix to 2 parts heavy sugar syrup as indicated earlier in directions on preparation of patties.

Installation of Patties

In early March, remove hive cover and smoke the bees down below the top bars. The patty, flattened into a cake about 1.5 cm (1/2 inch) thick, should be placed on the top bars directly over the center of the cluster. **The top of the cake must be covered with waxed paper to prevent dehydration and hardening.** The inner cover, when used, should be inverted with rim side down to provide space for the cake. New cakes should be added before the previous cakes are consumed. Feeding patties at seven to ten day intervals is generally satisfactory. Package colonies deficient in pollen should be fed in the same manner.

Note: When natural pollen is available and the weather is suitable for foraging, the colony will not use the pollen substitute or supplement. However, in early spring and during any dearth periods, pollen supplements and substitutes will be readily taken up by the bees.

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