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COMPARISON OF METHODS FOR WINTERING HONEYBEES IN THE PRAIRIE PROVINCES

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Comparison of Methods for Wintering Honeybees in the Prairie Provinces

Honeybees have developed a protective device, cluster formation, for survival during prolonged cold spells. In late fall, when temperature variations are common, the honeybees form a loose cluster around the queen to conserve heat and energy. The temperature at the outer edges of the cluster is approximately 57°F. and in the center of the cluster, around 86°F. The bees expand or contract this cluster formation with the external temperature changes. The cluster is generally formed over the lower portion of the accumulated honey and pollen stores in the frames. The bees in the warmer portion of the cluster pass the food to those on the periphery and also generate heat by their body movements. Activity within the cluster is reduced to a minimum to conserve food.

Long extended cold spells may restrict cluster movement to new food supplies and cause starvation in the midst of plenty. Some form of protection is required, therefore, during the winter months to modify the extreme changes in temperature and permit survival of the colony. This protection may take the form of storing colonies in a cellar, or the provision of additional insulation around the hives that are wintered outdoors. Data collected at the Dominion Experimental Farm, Brandon, Man., during the past twenty years have shown that colonies wintered indoors in a cellar were confined to their hives for 167 days as compared with 103 days for those wintered out-of-doors.

Experimental Results

A variety of insulating materials for outside-wintering were tested under Prairie conditions. The results of these tests are given in the accompanying table together with the results from bees wintered in a cellar. It may be noted that the average loss in weight during the winter is relatively uniform for all methods and is not directly reflected in the spring strength of the surviving colonies. The indoor or cellar method of wintering is comparable in the mortality rate to the better types of insulation used for colonies wintered outside.

THIRTEEN-YEAR SUMMARY OF WINTERING METHODS OF ITALIAN COLONIES FOR THE YEARS 1942 to 1954

Experimental Farm, Brandon, Manitoba

Where Wintered	Type of Insulation	Years Tested No.	Colonies Stored No.	Mortality Rate %	Av. Loss Colony Weight lb.	Spring Strength Bees Frames
Outside	Unprotected (Checks)	9	54	33·3	38·0	$5\frac{3}{4}$
Outside	Tentest	9	54	18·5	39·0	$8\frac{1}{4}$
Outside	Wooden cases	9	54	17·7	41·0	7
Outside	Building paper	10	60	13·3	39·6	7
Outside	Balsam-wool	10	51	5·9	35·0	$8\frac{3}{4}$
Inside	Bee cellar	13	649	5·9	34·0	$8\frac{1}{4}$
Outside	Fiberglas	6	51	2·0	35·0	7
Outside	Planer shavings and paper	2	20	00·0	32·0	$9\frac{1}{2}$

The colonies referred to in the table were wintered in double broodchambers and each was provided with ten combs of honey and four combs of pollen. The minimum hive weight of these colonies, without cover, was 120 pounds at the first week of October.

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WINTERING OUTDOORS

Outside wintering has the following advantages over cellar wintering of colonies:

1. Cleansing flights are usually permitted later in the fall and during mild weather in the winter and in the early spring.
2. The conditions are more favorable for brood rearing in the early spring, because of cleansing flights.

In Alberta, however, there are periods of widely fluctuating temperatures during the winter months which are detrimental to colonies wintering outside and also in the cellar. In one known case a commercial beekeeper operates successfully a refrigerator unit in his cellar to offset these fluctuating temperatures.

As most colonies commence brood rearing in the late winter they need pollen reserves and ample honey supplies and should be packed by the middle of October. A site with a windbreak, preferably of trees is an important requisite.

The colonies may be packed singly, in pairs, or in groups of four. Some drifting of bees from one hive to another occurs when colonies are grouped but there is considerably economy in packing material.

Single-Colony Paper Pack

The least expensive, initially, and probably the most popular method in use on the Prairies is the single-colony paper pack. To accomplish this the bottom boards and second broodchambers are cleated with hive staples or lath straps. The entrance reducers are left in place. A top entrance in a solid bee-escape board or inner cover, is prepared by sawing a 2" x $\frac{3}{8}$" strip at an end of the board as illustrated in Figure 1.

Figure 1—Inner cover with entrance tunnel.

The inner cover, with the cut edge facing downward, is tacked to the top of the second broodchamber to hold it in place. A wooden entrance tunnel is constructed four inches wide, two inches deep, four inches long with the top board extending ten inches backwards for support. This entrance tunnel is fitted in front of the inner cover entrance and the top board tacked to the inner cover, thus providing for four inches of packing material in front of the hive. The colony is now ready to be placed on a sheet of waterproof tar paper laid on level ground. The area of this tar paper should extend four inches in all directions beyond the bottom dimensions of the hive. A rim for the paper case is made from four 24" lengths of 1" x 4" lumber with their broad ends nailed together. The rim is placed over the colony touching the front of the bottom board and the extended tar paper on the ground is folded upward within the rim.

Another sheet of waterproof tar paper, 36 inches wide and 100 inches long is placed on edge, outside the rim base and attached to the rim with strips of lath. The length of this sheet allows for two to four inches of insulation material around the hive, with a five-inch overlap at the back of the hive. A "scutan" tar paper is satisfactory but "fibreen" is more durable.

In apiaries located on low-lying land or where water from spring thaws is likely to collect, the hives should be placed on mounds of earth.

The packing which may consist of planer shavings, leaves or chaff, is poured over the hive and pushed down between the hive and tar paper. Allow six inches of packing over the top of the hive. The extended paper is folded neatly over the top insulation and the metal hive cover set on top and tied in place with binder twine around the pack. (see Figure 2.)

Figure 2—Single colony paper pack.
Courtesy Provincial Apiarist, Saskatchewan, Dept. of Agriculture.

The Two-Colony Pack

The enclosure of two colonies in one pack appears to be the most economical method with respect to the best utilization of the wrapping material. The insulation material when not in use, can be wrapped in the paper rolls and stored.

Balsam-wool, a wood cellulose material, has received the highest rating of any of the materials tested to date on colonies at Brandon. However, any good quality insulation material should prove satisfactory.

The materials and dimensions required for this pack are as follows:

	Width	Length
Two sheets of tar paper or fibreen	36″	46″
One layer of insulation (or bats)	33″	9′9″
One sheet of tar paper or fibreen	36″	10′0″
One sheet of tar paper or fibreen	36″	3′8″

Plate I illustrates the method of packing. Colonies, for convenience, should be spaced six feet apart in the row so the area between the hives can be levelled prior to packing. Preparation of the hives prior to packing is the same as for the single colony except that the wooden tunnel is omitted.

The two sheets of paper, referred to in the foregoing list of materials, are laid lengthwise between two colonies. The latter are then moved from their stands and centered side by side, with the metal covers removed, on top of the two pieces of paper (Figure 2), (Plate I). The projecting edges of the top layer are turned upwards and tied with binder twine or string (Figure 3, Plate I). The protruding portion of the bottom board necessitates that a little care be taken when folding and tying the top layer of paper to prevent it from being torn. The insulation is then

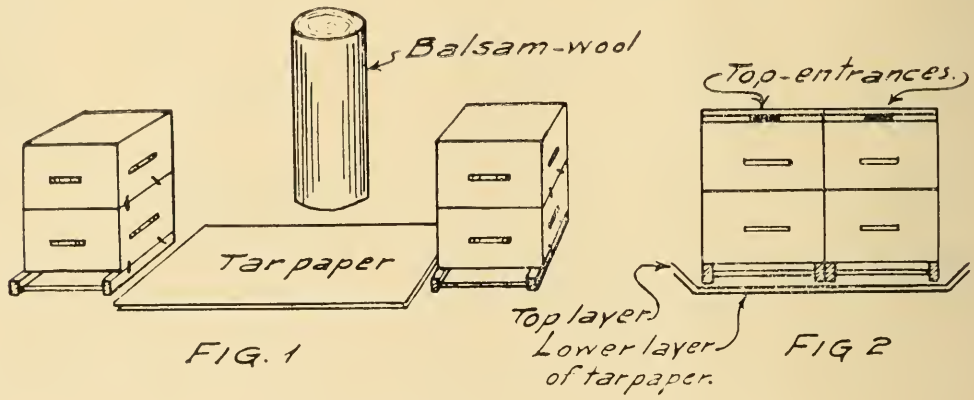
placed against the back of the hives, in an upright position wrapped around the sides and ends like a blanket, and tied securely near the top and bottom of the hive, Figure 4, Plate I. The upper edge of the wrapping paper extending above the hive, is folded lengthwise over the tops of the hives.

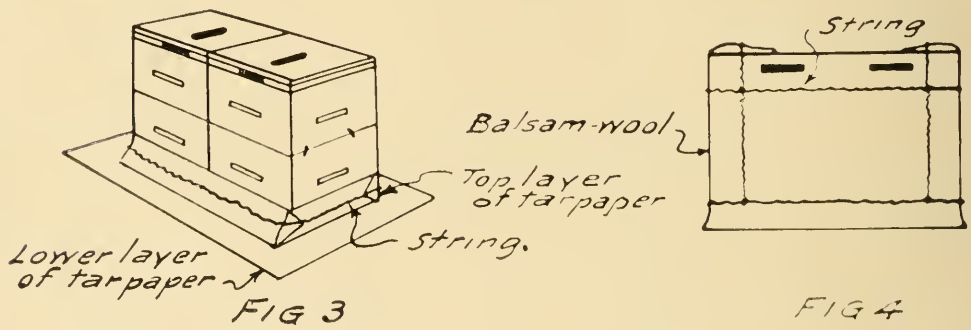
The lower sheet of paper is next folded upward over the lower edge of the insulation and tied. The sheet (36" x 10') is then wrapped around in the same manner as the insulation, making sure the paper completely covers the folded-up edges of the bottom sheets of tar paper, because the insulation has a tendency to ride upward when the lower string is being tied. A string tied lengthwise and crosswise of the pack, as shown in Figure 6, Plate I, will keep the cap securely in place. Openings are cut through the two layers of paper and insulation to coincide with the openings made in the inner cover rims.

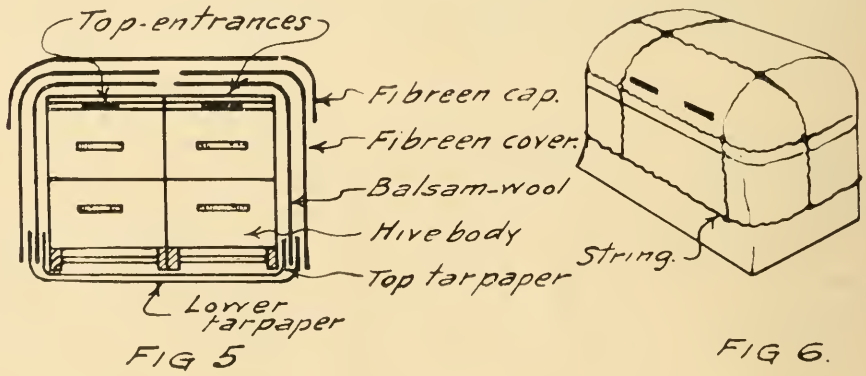
In spring, the component parts are removed and laid on the long sheets of paper, rolled and tied for summer storage. The material, with care, will last from five to ten years, with the exception of the two ground sheets which are replaced annually.

Although both colonies face the same direction in the illustration, they may face opposite directions. It is not advisable to have openings face the north.

Plate I.







Two-Colony Balsam-Wool Pack.

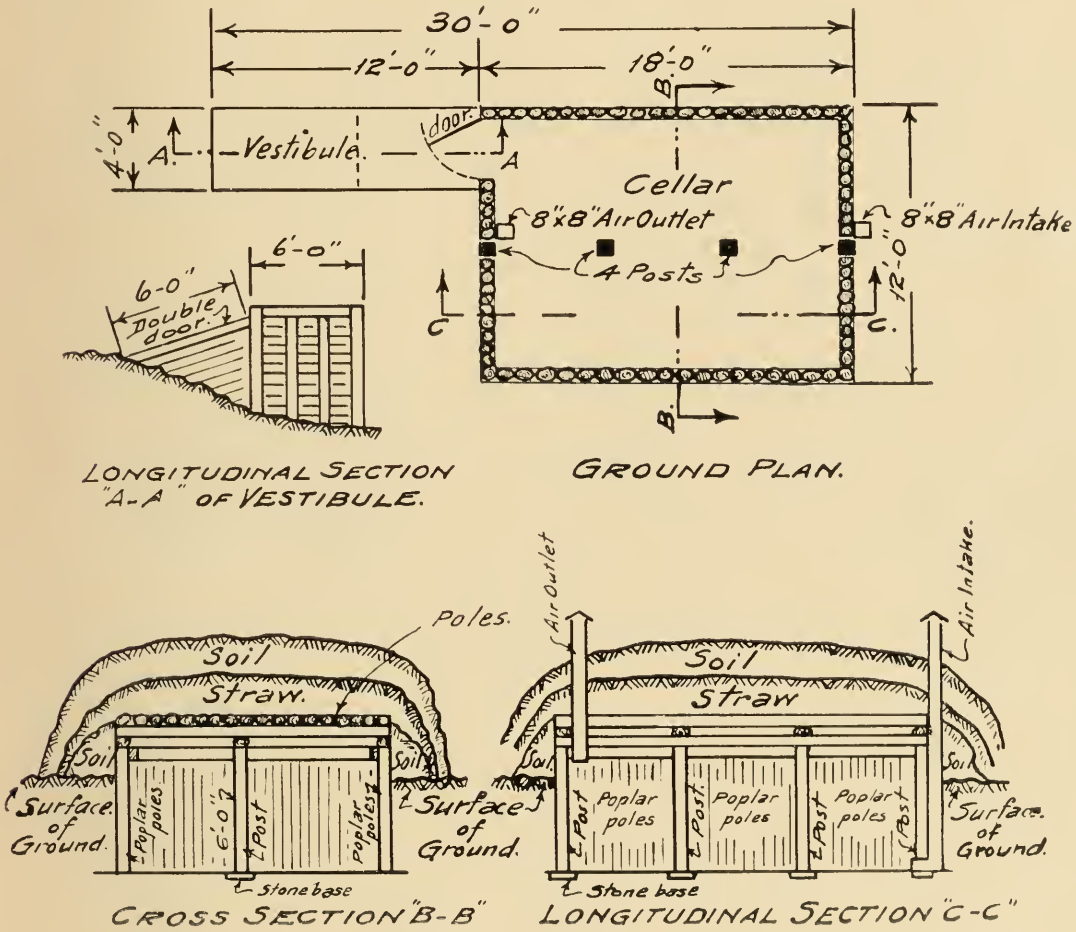
CELLAR WINTERING

The basement of a house, honey-house, or a dugout may be modified to form a suitable bee cellar. The essential requirements for the cellar are as follows:

1. Complete darkness.
2. Ventilation, usually provided by at least two air vents with adjustable openings.
3. A space of 12 to 15 cubic feet per colony plus room for passage between rows or tiers of colonies.
4. Temperature of cellar should be maintained between 35° to 45°F. with a relative humidity of approximately 65 per cent.

The sketch in Plate 2 illustrates a bee cellar that was used successfully for a considerable number of winters at the University of Manitoba.

Plate 2.



A Bee Cellar

Colonies tiered in pairs, with a 2" space between the tiers have shown a higher survival rating than those where the tiers abut each other for the full length of a cellar wall. The use of metal hive covers also helps to provide space between tiers and appear to be beneficial in colony survival if the bee cellar is very dry. Bran bags, doubled over, may be used to replace the metal covers, if the cellar is excessively damp.

When colonies are to be wintered inside, they should be moved to the cellar during the first two weeks of November, or immediately after the last good cleansing flight. In the spring, they should be moved from the cellar around April 10 to 15.

SUMMARY

Results at the Experimental Farm, Brandon, Man., have shown colonies of bees can be successfully wintered provided reasonable care is taken to supply the colonies with sufficient feed and protection. It is also necessary that the colonies have healthy queens to provide adequate populations of young bees for winter storage.

Packing colonies for overwintering requires little time once the material is prepared. Colonies stored in a cellar require little attention after the ventilators have been properly adjusted to the required temperature.

Wintering bees is a profitable undertaking.

Edmond Cloutier, C.M.G., O.A., D.S.P., Queen's Printer and Controller of Stationery, Ottawa, 1955.