Farm Production & Practice

Ministry of Agriculture and Fisheries

Beekeeping
Pollen Production
Pollen Trap Design

Honey bees are highly adapted for collecting pollen on their hairy bodies as they come into contact with the stamens of flowers. Millions of tiny pollen grains are packed together by the bees onto their corbiculae, or "pollen baskets", on their hind legs.

Beekeepers can collect the pollen pellets from these worker bees by forcing them to squeeze through narrow apertures which dislodge the pollen from their hind legs.

The pollen thus harvested can be used as a supplementary protein feed source for bees when their own pollen supply is inadequate, or sold for human consumption as a health food.

This AgLink discusses the design of the pollen trap and should be read in conjunction with AgLink FPP 532 on pollen, its collecting and processing.

Pollen trap design

There are two basic designs of pollen trap. One fits under the hive and has either a vertical or horizontal trapping screen or plate, while the other type fits in the entrance and usually has a vertical trapping screen or plate.

The screen or plate through which worker bees pass, causing the removal of the pollen loads, is made from either:

- 5 mesh to the inch galvanised woven wire (4.28 mm square aperture x 0.9 mm diameter wire), or
- plates of aluminium, plastic, or perspex with 13/64 inch diameter holes drilled or punched in them (the equivalent metric drill is 5 mm, which is slightly on the small side).

Pollen which is removed from the bees' legs falls through a horizontal, galvanised woven wire screen* (6 mesh to the inch or 3.52 mm square aperture x 0.71 mm diameter wire) into a collecting tray. This mesh prevents bees from retrieving pollen from the collecting tray.

The tray also has a wire mesh base (12 mesh per inch or 1.87 mm square aperture x 0.25 mm diameter zincoid material). This allows maximum circulation of air through the pollen and retards mould growth. Aluminium or fibreglass flyscreen mesh is also suitable for the collecting tray.

Entrance traps are not recommended because they are difficult to fit on the hives, they must be removed to transport the hives, they have a limited holding capacity, and are more exposed to rain. Moulds grow very quickly on damp pollen making it useless for processing.

Traps that fit under the hives are commercially available and are based on a design from the Ontario Agricultural College in Canada, or the Western Australian Department of Agriculture.

Should beekeepers wish to design their own trap there are no critical measurements except the aperture size for the trapping screen, the pollen screen that stops the bees retrieving the pollen in the tray, and the screen bottom in the tray.

The pollen trap plan presented in Fig. 1 is an adaptation of the original Ontario Agricultural College trap. Further improvements and modifications can be made to this design and it can be built in different ways. For these reasons, full measurements and constructional details are not given.

Trap body

The trap is based on a three-quarter-depth super with external dimensions of 505 mm x 405 mm x 185 mm. The depth can vary but the opening for the pollen drawer should be big enough to admit a hand for cleaning.

Rebated joints, rather than butt joints, are used to construct the trap body and the pollen drawer. Rebated joints, nailed through the sides and the ends, are stronger and less prone to warping. However, if butt joints are used then allowances must be made for the length of the sides, the trapping screen, the pollen screen and the guide rails for the screens.

If a permanent hardboard or plywood base is attached to the pollen trap, screened holes should be incorporated in the base to provide extra ventilation. The trap should be raised off the ground on an existing floorboard, a pallet, or on permanent 100 mm x 50 mm runners.

With the exception of the runners, tanalised timber must not be used to construct pollen traps as it can be toxic to bees.

Galvanised nails (75 mm) can be partially driven into the top guide rails to fit inside the corners of the bottom brood box.

These nails help locate the brood box on the pollen trap, especially where hives are prone to damage by stock.

Entrance size

Mice should be discouraged from entering pollen traps by placing bait in two to three protected locations within the apiary (under hives), or by reducing the depth of the entrance to 8–10 mm. This may require a special entrance fillet. Mice droppings are impossible to machine dress out of dried pollen.

Guide rails

The three guide rails that support the trapping screen and the pollen screen continue along both sides of the trap

* Current stockists of wire mesh include:

Mounts Wire Industries, Harris Road, East Tamaki, Auckland
7 Liverpool Street, Christchurch

Eclipse Wire Waikato Ltd, Te Rapa Road, Hamilton

W.H. Harris Ltd, 41 Braddon Street, Christchurch

aglink

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1st revise

Information Services, MAF, Private Bag, Wellington, N.Z.

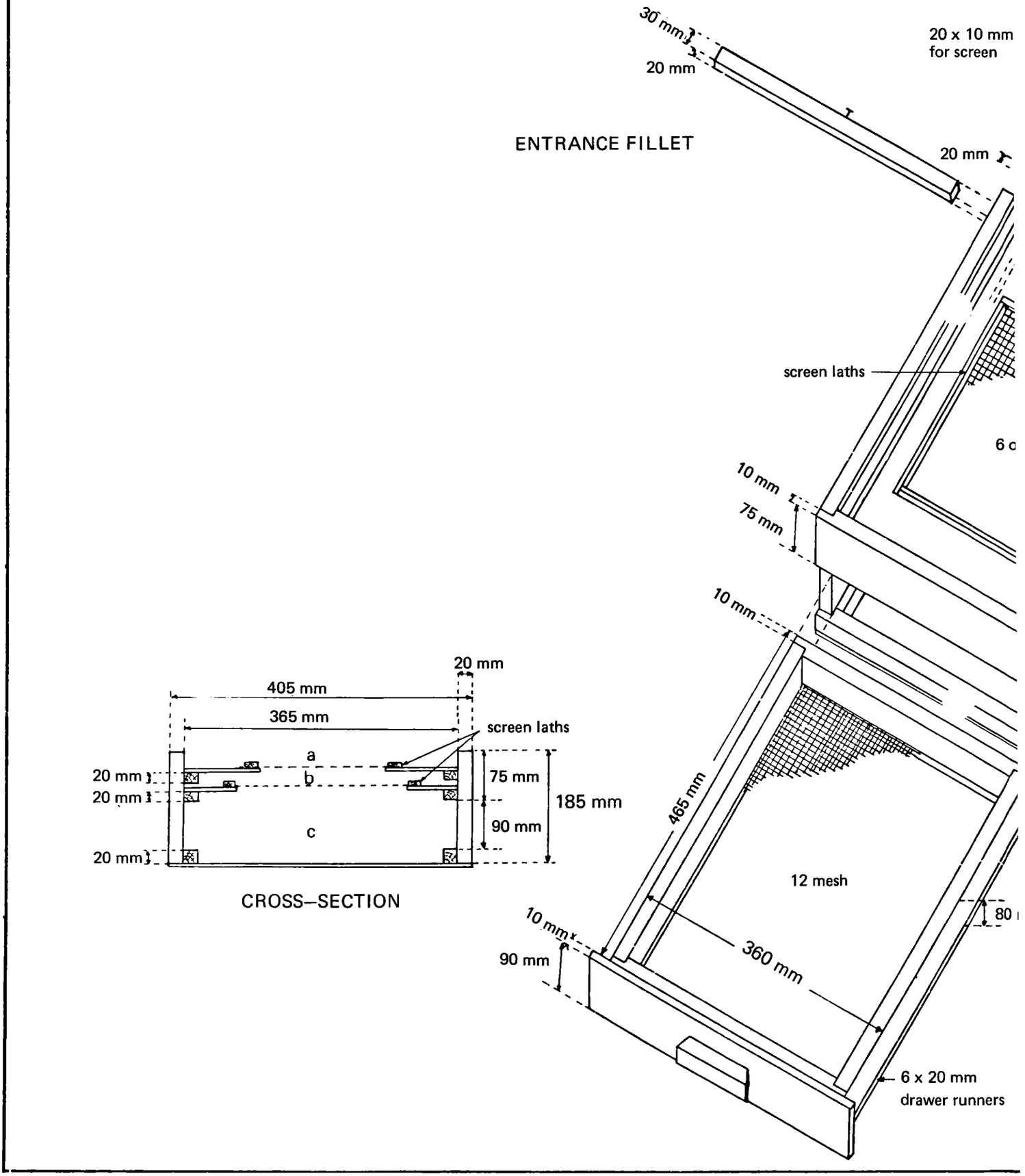
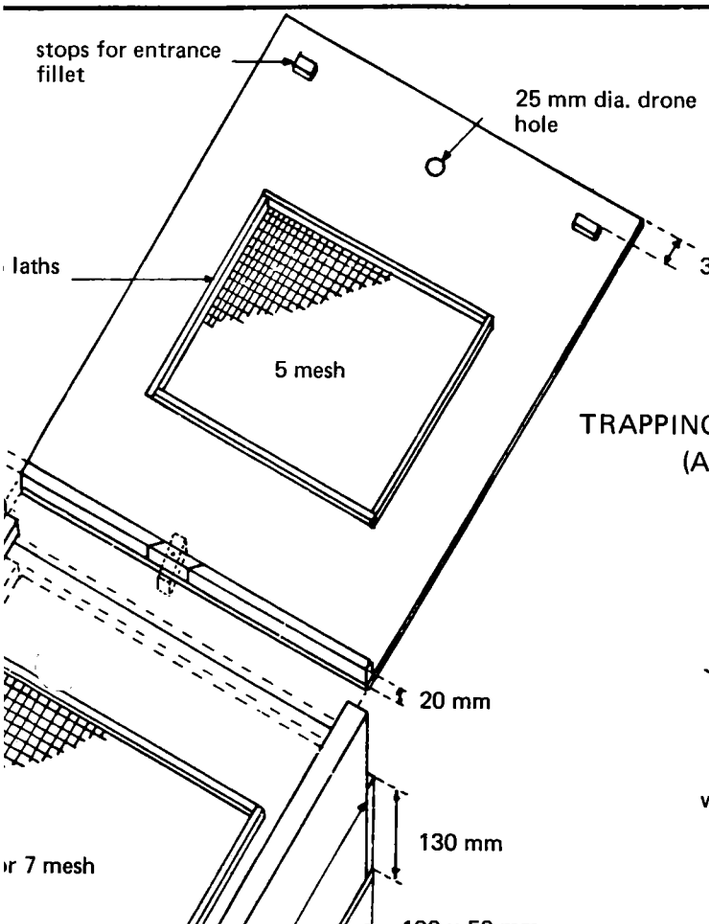
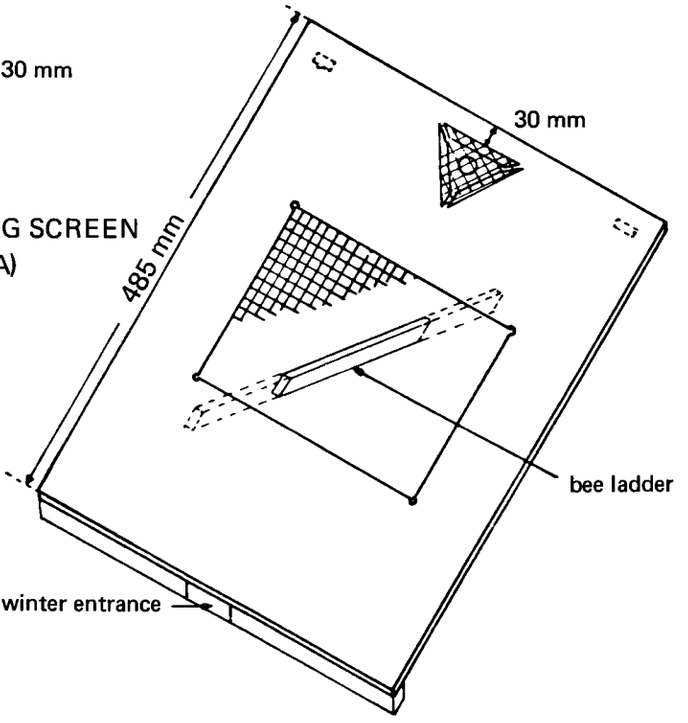


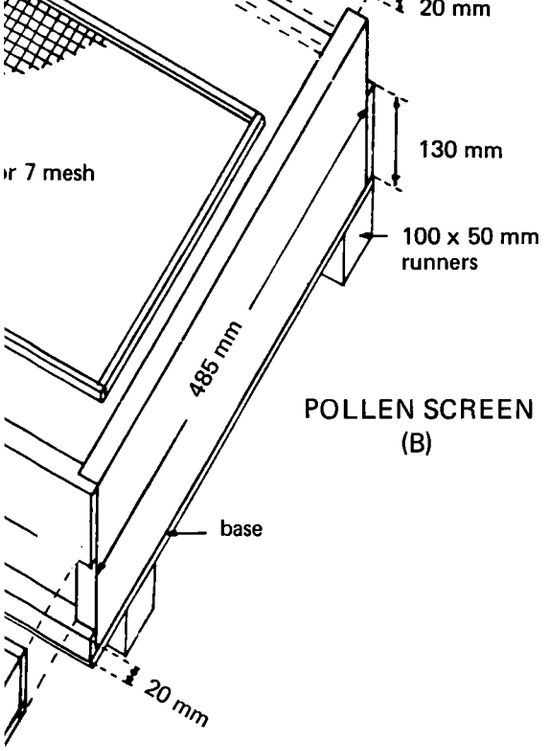
Fig. 1: Pollen trap design.



TRAPPING SCREEN
(A)



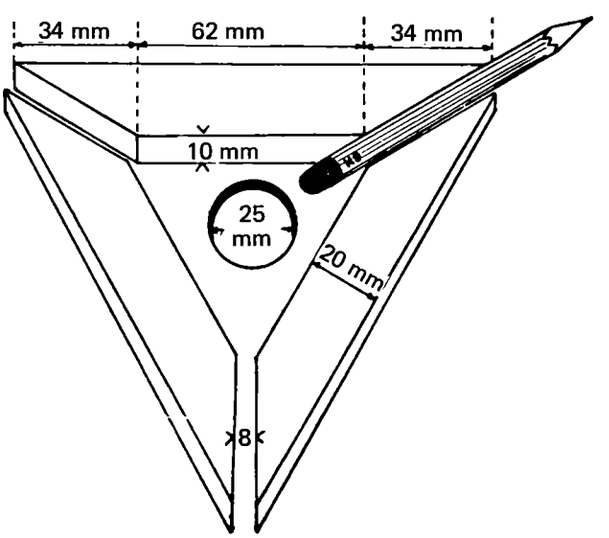
REVERSE SIDE (A)



POLLEN SCREEN
(B)

mm

POLLEN DRAWER
(C)



DRONE & BEE ESCAPE

as well as the back. However, the pollen screen rails are recessed 30 mm back from the entrance to provide a stop for the entrance fillet when it is fitted in place.

The distance between the guide rails for the trapping and pollen screens will depend on the thickness of the material used to construct these screens.

In practice the screens become firmly propolized in place and are difficult to slide in and out. However, the trapping screen can be lifted up once the hive is removed from the trap and then the pollen screen can be loosened. Smearing petroleum jelly along the edges of the screens may retard the build up of propolis.

Entrance fillet

To engage the trap the entrance fillet is placed above the trapping screen and beneath the bottom hive body that is resting on the trap. Small blocks on top of the trapping screen 30 mm in from the entrance, help locate the fillet. To disengage the trap the fillet (Fig. 1) is placed between the trapping screen and the pollen screen, or it can be left out altogether. However, some pollen will still be trapped if the fillet is just removed.

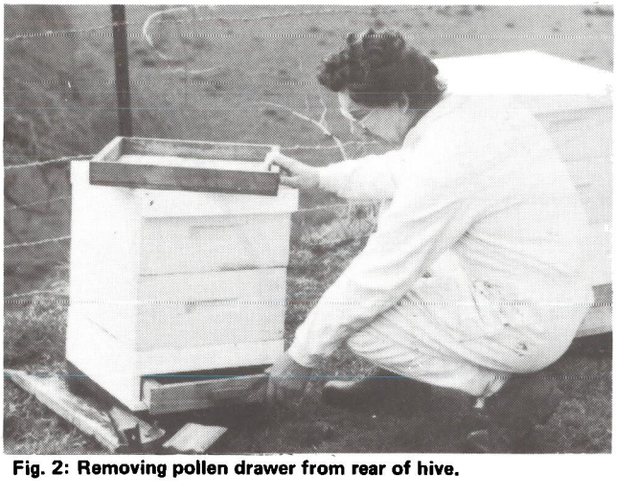


Fig. 2: Removing pollen drawer from rear of hive.

Trapping screen

This screen can be made from 6–7 mm plywood or hardboard. On its top side it must contain small blocks to locate the entrance fillet, and a winter entrance can be built in at the opposite end. To engage the winter entrance the trapping screen is simply reversed.

The screen should contain a drone and bee escape, which can be a 10 mm diameter hole, a Porter bee escape or a bee escape as illustrated. The latter is set back 30 mm from the edge to act as a stop for the entrance fillet when the trap is disengaged. The wooden bee escape should be covered with wire gauze.

The opening in the trapping screen is cut on a circular saw or with a jig-saw. The size is not critical but it should be smaller than the hole in the pollen screen directly beneath. The hole should be kept back from the entrance to afford protection from the rain.

Five mesh to the inch galvanised woven wire (4.28 mm square aperture x 0.9 mm diameter) **must** be used in the trapping screen. As rolls of wire are usually 600 mm wide, screen 200 mm or 300 mm would make most economical use of the wire.

A double screen is more effective than a single screen, especially if the apertures are off-set. In a double mesh trap the 2 wire screens can be fixed each side of the trapping plate itself so that they are spaced 7–8 mm apart. Small strips of wood between the wire would help to keep the screens apart. Bees can be come trapped between these double screens, and frequent checks are necessary to make sure they are not becoming blocked with dead bees.

The screens should be fixed to the trapping plate by thin laths of wood. These protect the edges of the wire mesh and prevent it buckling up and allowing bees to crawl underneath.

One or more strips of wood need to be provided to act as "bee ladders". Short ladders can be screwed to the wire mesh and hang down from it, or alternatively, longer lengths can be attached to the trapping plate itself.

Pollen screen

This screen is made the same way as the trapping screen, except it has a larger opening. The mesh size should ideally be 7 mesh to the inch but this is difficult to obtain. The alternative is 6 mesh to the inch (3.52 mm square aperture x 0.71 mm diameter) woven wire.

Some bees may get through this 6 mesh wire and end up in the pollen tray.

Pollen drawer

The pollen drawer illustrated in Fig. 2 opens from the rear of the trap but can be made to open from the front or the side of the trap. This may be essential if the pollen collecting hives are located on a pallet.

Extra care should be taken when making the drawer as it can receive a lot of physical abuse in the field, especially if it jams or needs cleaning out. This is usually accomplished by banging the drawer on the ground.

The drawer should be made at least 5 mm narrower than the inside width of the trap, and it pays to fix the handle to the drawer by screws and glue.

Thin laths of wood (6 to 10 mm x 20 mm) should be nailed over the edges of the wire mesh to act as drawer runners and to protect the beekeeper from the exposed edges of the wire.

Twelve mesh to the inch (1.87 mm square aperture x 0.25 mm diameter) wire or plastic mesh should be used on the base of the pollen drawer.

Preservation of woodware

It is desirable to treat the wooden components of the trap with a fungicide solution such as Metalex, Tricunol or Woodlife II. All surfaces should be painted inside and out or sealed with hot paraffin wax. This prevents the timber absorbing moisture and stops the trapping screens and pollen drawers from jamming. If hot paraffin wax is used, the metal screens should be banged sharply against a solid object as soon as they are removed from the wax. This clears the wax from the screens. All parts should be waxed separately.

Further reading

FPP 532: Pollen Production/Collecting/Processing.

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