DUNFERMLINE AND WEST FIFE BEEKEEPERS ASSOCIATION

GUIDELINES FOR THE USE OF OXALIC ACID SUBLIMATORS

Oxalic acid in its gaseous form can easily be produced by the application of heat (Approx. 160°C) to Oxalic acid dihydrate powder. The exposure limit for concentration of oxalic acid in air has been set at < 1.0mg/m^3 in Germany and this has been shown to be well above the level found when using the methods detailed below. The risk when working with the acid is mostly that of local irritation to the skin and mucous membrane hence the use of mask, rubber gloves and protective goggles.
The procedure should take place on a still day when the temperature is below about 5ºC when the bees will not be flying.

Precautions:

Due to the risk detailed above the operator should wear a suitable mask (EN149 FFP3), rubber gloves and protective goggles. Any other person close to the hive being treated but not directly involved should stand 'up wind' and also be protected although a mask to EN149 FFP2 should be sufficient.
When used in an area such as a **bee house** with restricted air flow then all involved should use a mask to the higher standard EN149 FFP3.
In all cases care should be taken to ensure a good fit to the mask.

HEALTH AND SAFETY: -

- **AVOID INHALATION OF ACID POWDER OR AEROSOL DUST.**
- **Keep away from Children, Eyes and Mouth.**

In the event of **powder inhalation** seek **medical help** immediately.
In the event of contact with eyes or mouth flush with clean water.
In the event of spillage mop up immediately and flush with clean water.
In the event of ingestion drink copious amounts of water.

NOTE! These are guidelines for information only and The Association accepts neither liability nor responsibility for their accuracy. Members use this information at their own discretion and risk.

Methods of use:

At present 2 main types of sublimators are in use: Electric and Gas powered. The electric sublimators are at present all intended for use through the hive entrance and are typified by the Varrox device (marketed by Thorne in the UK). Gas sublimators are not currently available commercially in the UK but are available in Europe in a variety of patterns. The Scottish Beekeeper has published details of two DIY devices and these are taken as the basis of these guidelines. (Dec 2004 pp 325 & 326)

Varrox Electric Powered Vaporiser:

This comprises a heater, a metallic support and electric lead terminated with battery clips. In use it is connected to a 12V power source, usually a 12 V car battery.

The vaporiser should be loaded with **1g** of acid per brood box (i.e 1g for single and 2g for double hive) and inserted through the hive entrance so that the pan is directly below the cluster. Foam should be used to close the entrance to ensure bees stay in the hive throughout treatment and the collection tray placed under any ventilated floor if fitted. This is usually a close enough fit but any aperture at the rear should also be closed off. A 12V car battery is then connected to the device and left for 2 1/2 minutes after which the battery is disconnected and, after a further 2 minutes, the Varrox vaporiser can be removed. The hive should then be left closed with foam for 10 to 15 minutes to allow the acid aerosol powder to settle. After use the unit should be cooled in a bucket of cold water and dried before re-use.
NOTE – Observation suggests that the Oxalic acid vapour condenses within the hive into a fine 'aerosol' powder of acid crystals and it is these which percolate through the hive.

Gas Powered Copper Pipe Vaporiser:

This comprises a short length of 15 mm copper water pipe open at one end and with a compression elbow fitted to the other. The unused end of the elbow is blanked off and is used to charge the device with acid prior to use.

To use the device it is necessary to remove any supers on the hive so as to expose the tops of the frames in the brood chamber. An empty super is then placed on the hive and a modified roof or special chamber placed on top. The hive entrance must be closed with foam and the collection tray placed under any ventilated floor if fitted. This is usually a close enough fit but any aperture at the rear may also be closed off if there is a large gap.
The charged device is inserted into the hive through an aperture in the side of the roof / chamber and heat applied to the protruding elbow using a propane gas torch or blowlamp. After a minute or so the oxalic acid vaporises and is discharged into the chamber where it condenses back into a very fine aerosol crystal and percolates down through the hive. After a few minutes the chamber can be removed and the standard crown board and roof replaced.
The hive entrance version does not require the modified roof / chamber, it being inserted through the hive entrance in a similar manner to the 'Varrox' device and the rest of the entrance closed off.
Note! The pipe gets very hot and it will be necessary to place a **solid block** either side of the pipe to avoid burning foam producing toxic gasses.

Experience using these devices has resulted in general consensus that the 'Hive Roof' device used with a suitable modified roof or special chamber is more successful than the 'Hive Entrance' device which should only be used with hives such as the WBC where top application is difficult to achieve.

A dose slightly larger than that specified for the Varrox should be used – about **1.5g** per brood box to allow for the amount lost to condensation within the copper pipe..