

# Grain storage

30% OF FRUIT AND VEGETABLES are wasted due to the unavailability of proper processing and preserving. Here are some practical ideas from different sources.

## Is the seed dry enough?

Grains to be stored must be completely dry. Farmers can check this by biting on the grains. A very sharp cracking sound between the teeth is a sign that the seed is dry enough to be stored. Make sure watertight containers are used for storage.

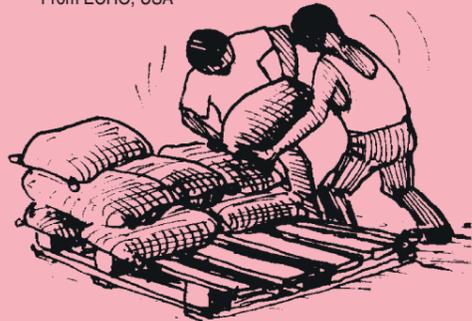
One way of ensuring grains keep dry is simply to hang maize cobs in the roof above the cooking fire.



## Turning sacks

Some pests of bean crops such as weevil larvae need to wedge themselves into positions from which they can bore holes with their mouths into stored grains. The extremely simple measure of turning sacks upside down every morning and evening for several weeks can reduce pest damage significantly. As the sack is turned, so the larva loses its position and has to begin again. After several days without success most weevils either starve or are crushed.

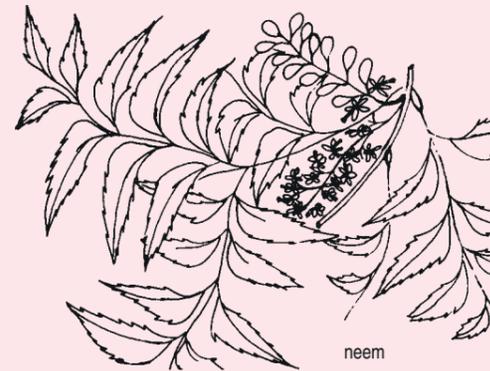
From ECHO, USA



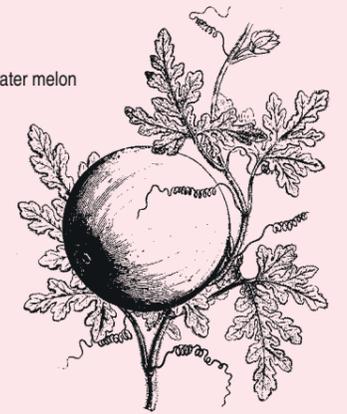
## Protective plants

Many local plants can be used to protect harvested crops from insect pests. Ask elders what plants have been traditionally used. A great many plants may help to protect stored grains from insect attack.

For example, **neem leaves** (*Azadirachta indica*) and leaves from the **cassia vine** (*Cassia nigricans*) can be dried completely and either used whole or powdered and mixed with cereal and bean seeds. Neem leaf powder can be mixed with water and clay to make a sticky plaster. Spread this over the inside walls of pots, baskets and granaries used to store grain.



wild water melon



Another useful species is the **wild water melon** or bitter apple, *Citrullus colocynthis*, which is closely related to water melon. This is found in many countries in Africa, the Middle East and Asia.

The strong chemical, colocynth, is found in the fruit pulp of the fully grown but unripe fruits. Dried pulp could be mixed with water and clay and used as plaster. Dried and powdered fruit pulp could also be mixed into stored grain. In Egypt, crushed dried fruit are mixed with ashes, lime and dried chillies and stored with wheat and rice. In Egypt they also dry the gourds, make small holes and place them with clothes to protect them from insect damage.

Local names include *handal* (Egypt), *tumba* or *gartoomba* (India), *gareb*, *unun* (Somalia), *ekir* (Kenya) and *tagalate* (Niger).

Freshly harvested **ginger roots** can be dried and powdered and mixed with beans and grains. **Cashew nuts** also have protective value. Drill three holes into each nut to release the liquid and mix well with grains.

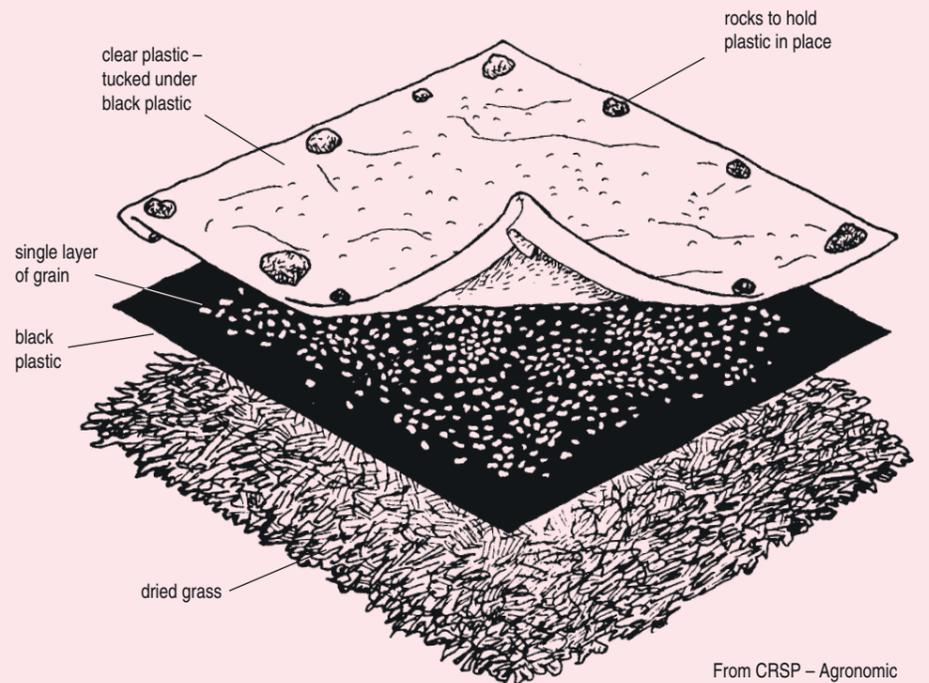
With thanks to SEPASAL for much of the above information. SEPASAL, Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AE, UK.

## Solar driers

High temperatures will kill weevils – and their eggs, larvae and pupae. CRSP have designed a simple solar heater in which the temperature of grain will be so high that all pests will be destroyed.

Place a sheet of black plastic on top of an insulating mattress of dried grass. Cowpeas, beans or grains are placed on this in a single layer. Then a layer of clear plastic is placed over the grains. The clear plastic and black plastic are folded together and tucked underneath using small stones to hold them in place.

Treat the beans and grains as soon as possible after threshing. Use the heater when the weather is clear and sunny. Treat seeds for at least 2 hours around midday. Then store the grains (using one of the improved methods shown opposite). The solar heater is ready to treat more grains the next day.



From CRSP – Agronomic Research Institute of Cameroon, Maroua Research Centre, Cameroon

## Storage of cowpeas in ash

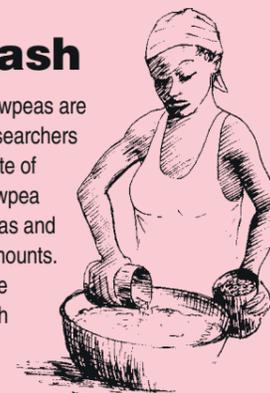
In areas of northern Cameroon, cowpeas are traditionally stored in ash. Now, researchers at IRA Agronomic Research Institute of Cameroon have confirmed that cowpea weevils cannot reproduce if cowpeas and ash are mixed together in equal amounts. They recommend the use of a large clay water jar. All kinds of wood ash are effective. They should be sifted to remove large lumps of charcoal. One cup of wood ash and

one cup of cowpeas are added to a bowl and mixed well before continuing to add equal amounts of ash and cowpeas.

Once the bowl is full, they are poured in to the clay jar and pressed down very firmly to remove air. When the jar is filled, a 3cm layer of ash should be used to cover the top. This needs to be replaced each time cowpeas are removed. Make sure you wash the cowpeas before you cook them!



From CRSP – Agronomic Research Institute of Cameroon, Maroua Research Centre, Cameroon



## Using vegetable oils

Research work at CIAT in Colombia now confirms a long established Indian tradition. Coating dry beans with vegetable oil is very effective in controlling bruchid beetles. The oil seems to interfere with the breathing of the insects. All kinds of vegetable oils are effective, but unrefined cooking oils such as palm oil are not only cheaper but also take longer to become rancid. **Use only edible vegetable oils.**

Beans treated in this way will still germinate well if used as seed.

In Mali, both cereal and legumes are treated with oil or melted butter. A second treatment after 12 days gets rid of any eggs which have survived the first treatment. Sheabutter is very popular.

