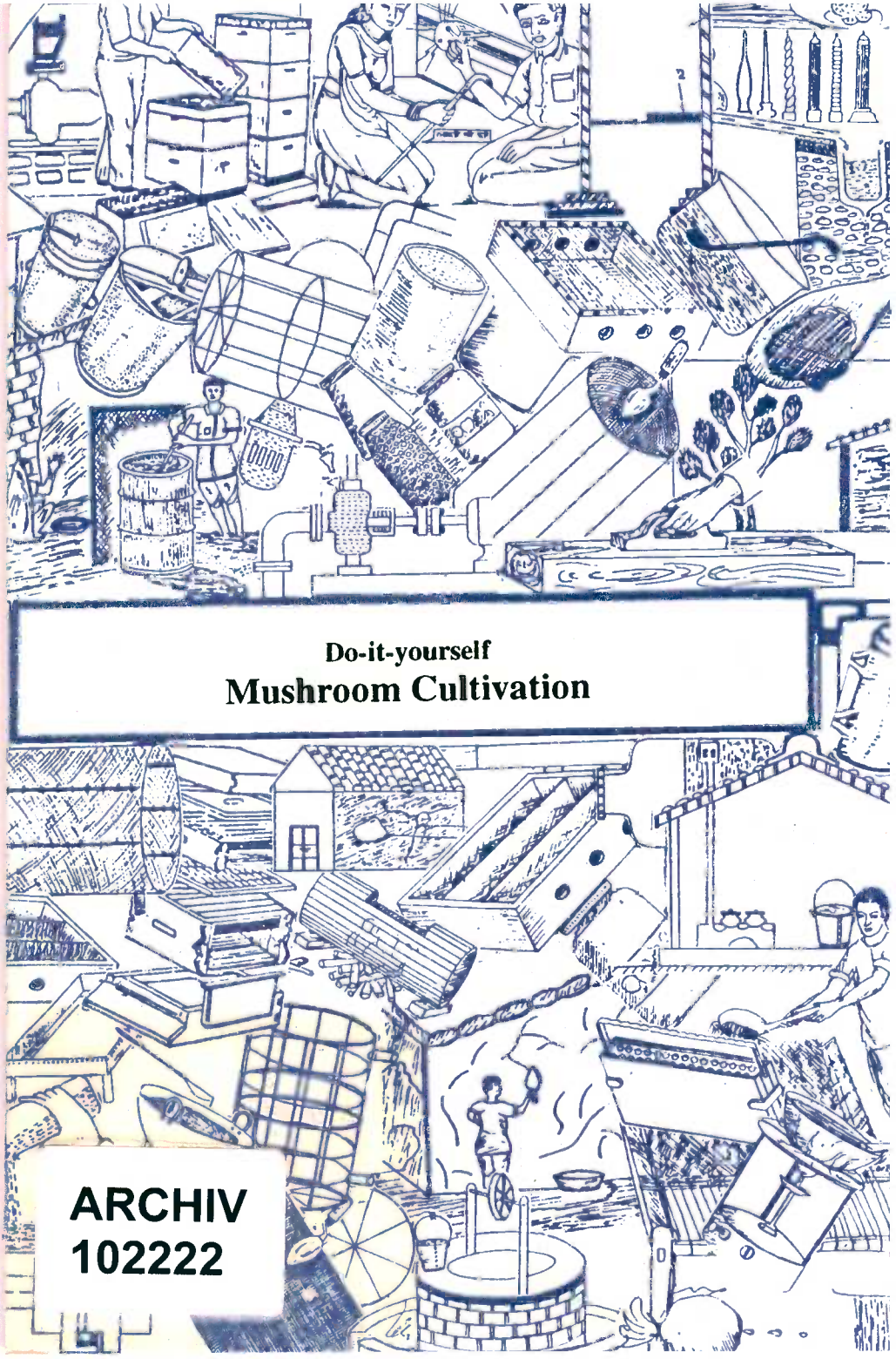
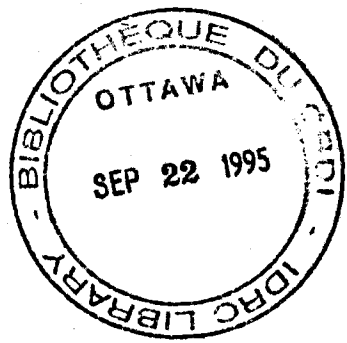


Do-it-yourself

Mushroom Cultivation



MUSHROOM CULTIVATION

Sanjiv Narain

WHY MUSHROOMS ARE GROWN :

In a rural country like India where a significant proportion of our population is undernourished eating of mushrooms which contains more protein per 100 grams than almost any vegetable could stem the tide. Protein is the building material for all body tissues and is made up of various amino acids. All vegetable proteins are at least partly deficient in some of the essential amino-acids, some of them very badly so, but mushroom protein is better than most. Mushroom is one of the lowest calorie foods of all, only two calories an ounce, as such it could be of great help for middle-aged persons suffering from syndrome X (Its a disease in which middle aged persons develop a paunch around their stomach). It could also serve as a partial replacement for meat and fish. Mushrooms contains large quantity of folic acid which is of vital importance for treating anaemic conditions in human body. Being entirely deviod of starch and sugar, mushroom is exceeding useful for diabetic patients. It also contians high amounts of potassium phosphorus, copper and iron, and these vitamins are not destroyed by cooking, canning, drying and freezing.

WHAT ARE MUSHROOMS :

Mushroom is type of cap fungi (fungi are plants that can not make their own food so have to live off other plants or animals) with gills.

Cap Mushroom

GROWING SYSTEMS :

Primarily there are two main systems of growing mushrooms. They are shelve system and tray system.

(A) Shelves :- Wooden planks made of strong timber 1 to 1.5 inch thick should be used. The upright and the horizontal members of the structure for holding the planks must also be made of strong timber. The shelves should be 3-4 ft. wide. Usually three or four tiers of shelves are made in a row, with a working space of 1.5 feet between each shelf. A gangway of 2 ft. width between each row is maintained to facilitate watering, picking etc.

(B) Trays :- Trays can be made from any material available locally. Packing cases, apple boxes or wodden cases used for packing liquor bottles can be used. A convenient size of tray is one metre long, half a metre wide and seven inches deep. All trays must

be of uniform size to facilitate stacking of each on top of the other. Each tray needs a corner support 12 inches longer than the sides.

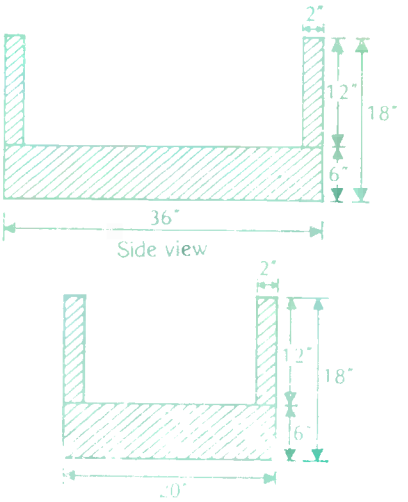


Fig. 1 - Mushroom trays with long end supports.

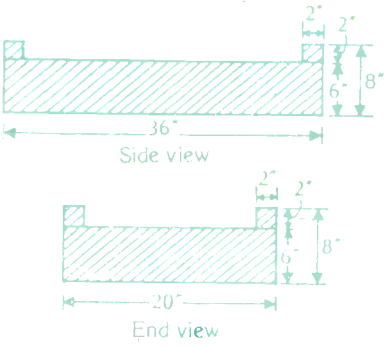
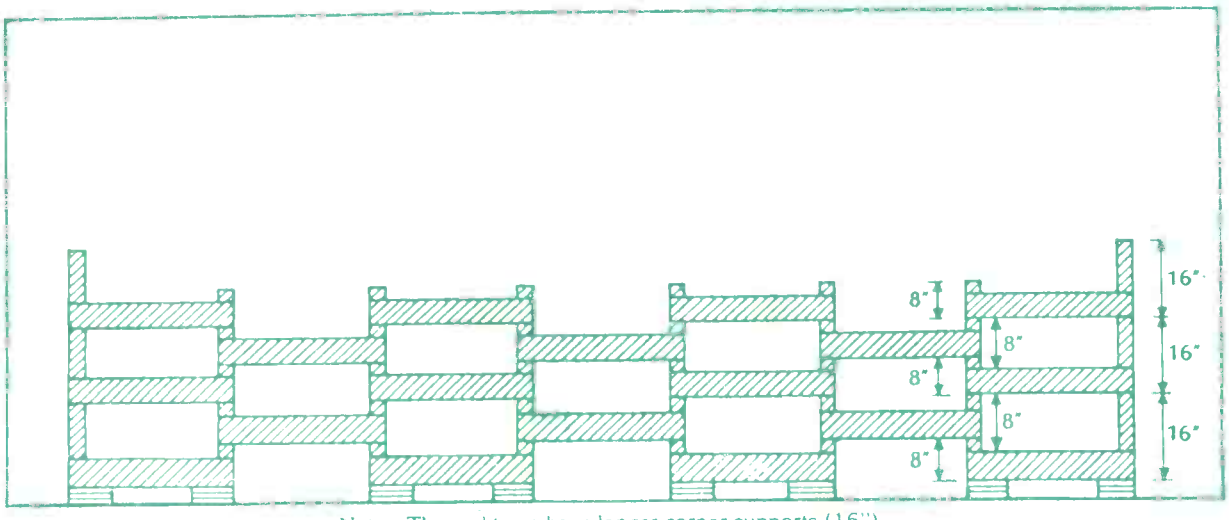


Fig. 2 - Mushroom trays with short end supports.



Note - The end trays have longer corner supports (16")
Other trays are 6" high with four corner supports 8" long.

Fig. 3 - Trays stacked in chequer - board fashion

SITE SELECTION :

Mushrooms can be grown satisfactorily in a motor garage, a verandah closed temporarily with tarpaulins, or in a cold storage lying empty during the winter months. An abandoned poultry farm can be converted into a mushroom house with a minor change. Mud huts with windows and thatched roof, or a wooden frame house covered with skins of tarred hessians would serve the purpose. Even an wodden frame with a double layer of chicken were with straw stuffing covered with sheets of polythene would be equally workable.

HOW MUSHROOMS ARE GROWN :

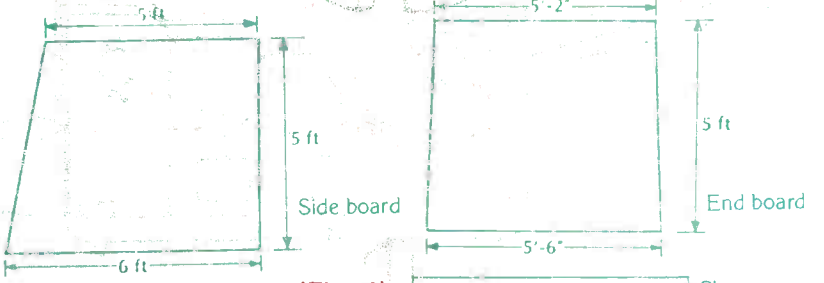
Cultivation of mushroom is a very exact science. The three main operations in growing are composting, spawning and casing.

(A) Composting :-

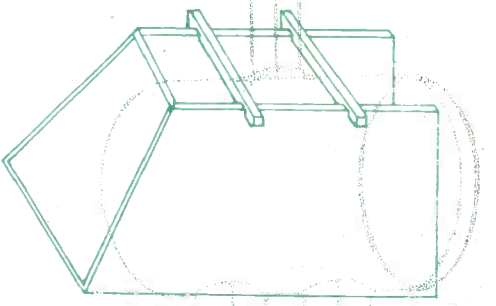
Compost is prepared by mixing wheat straw (Bhusa) with a number of organic and inorganic fertilizers in fixed proportion. The aim is to kill all harmful organisms present in the manure and transform the medium to be more suitable for mushroom growth.

Ingredients	Quantity
(1) Wheat Straw	300 Kg
(2) Calcium amonium nitrate (CAN)	9 Kg
(3) Urea (46%)	3.6 Kg
(4) Sulphate of Potash or Muriate of Potash	3 Kg
(5) Superphosphate (18% Phosphorus Pentaoxide)	3 Kg
(6) Spent brewers grain or wheat bran	40 Kg
(7) Gypsum	30 Kg
(8) Nemagon (60%) or Furadan 3G	40 ml
(9) Lindane or BHC 5% dust	250 gm
(10) Molasses	5 Kg

On the first day wheat straw is spread on a cemented floor to a depth of 9 inchs. By spraying of water, and turning of straw it is completely drenched. After 24 hours are added, half the above quantity of wheat bran made moist by adding water, 2/3rd of CAN and urea, full quantity of superphosphate and sulphate of potash. These are vigourously mixed and covered with gunny bags. After a day or two 5 Kg molasses and 40 ml of Nemagon mixed in half a bucket of water. The whole material is thoroughly mixed and made into a new stack. On the eleventh day the stack is opened and re-made. Dry patches are watered. On the 13th day 30 Kg of gypsum is added and the compost is re-stacked, thereafter every third day the compost is restacked and dry patches are watered. On the 27th day 250 gm Lindane at the rate of 30 ml to one litre is mixed into compost. On the 28th day if the smell of ammonia is emanating then re-stacking is carried out if not then the ready compost is filled in the trays.



(Fig. 4)



Side boards 5 ft. apart and End board held in position with two clamps

Fig. 5

Pasteurisation– Pasteurisation is done in a rectangular room with good air ventilation. The trays are layed as shown in figure. A temperature of 55% is maintained for around a week. After pasteurisation the compost is cooled down to a temperature of 24 deegres centigrade before spawning.

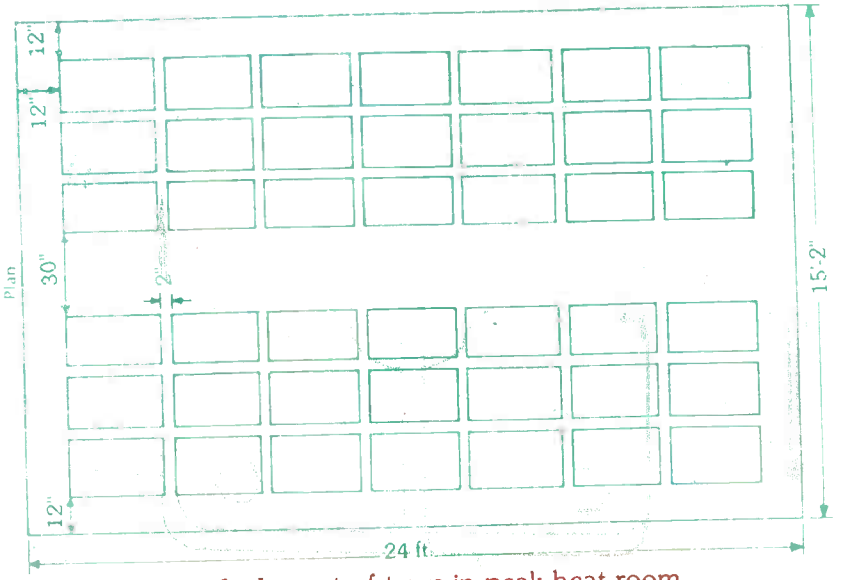


Fig. 6 - Layout of trays in peak heat room.

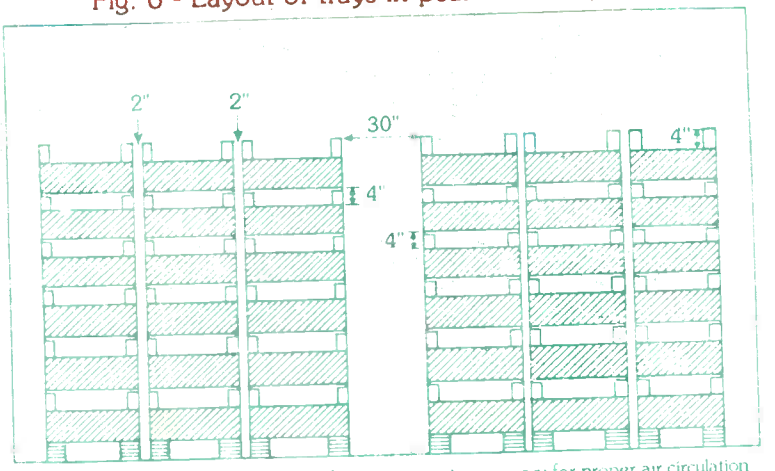


Fig. 7 - Peak heat room-end elevation of trays.

(B) Spawning :-

The process of introducing spawn (seed) into the compost is known as spawning. Spawn is generally supplied in glass bottles of 250 gm. The recommended percentage of spawn is 0.45% i.e. 4.5 Kg spawn for one tonne of compost.

Technique – Half the tray is filled with the compost and is lightly pressed into a wooden board to make it compact. Half the quantity of spawn is spread on the surface of filled compost. Remaining half is again spread to make another layer. It is pressed hard to make the compost as hard as possible. After spawning the trays are arranged in the growing room as shown in the figure. The compost is now covered with moist newspapers. Nuvan 100 E.C. is sprayed in the room to keep away flies. After 15-20 days the colour of compost changes from dark brown to light brown and the trays get filled with whitish growth, making it ready for casing.

(C) Casing :-

Casing means covering of spawned compost with a suitable material known as casing soil. Casing soil can be prepared by mixing medium clay sub-soil with sand in a ratio of 4:1. The pH of mixture should be tested and adjusted to a value of 7-8. Casing soil must sterilized by steam at 60°C for 4 hours, the soil should be cooled down before use.

Casing operation :- The newspaper covering should be removed and the surface tamped to level it. Starting from one end of the room the mixture should be spread on top of each tray to a depth of 1-1.5 inch. The casing layer should not be pressed after it is spread and levelled.

CROP MANAGEMENT :

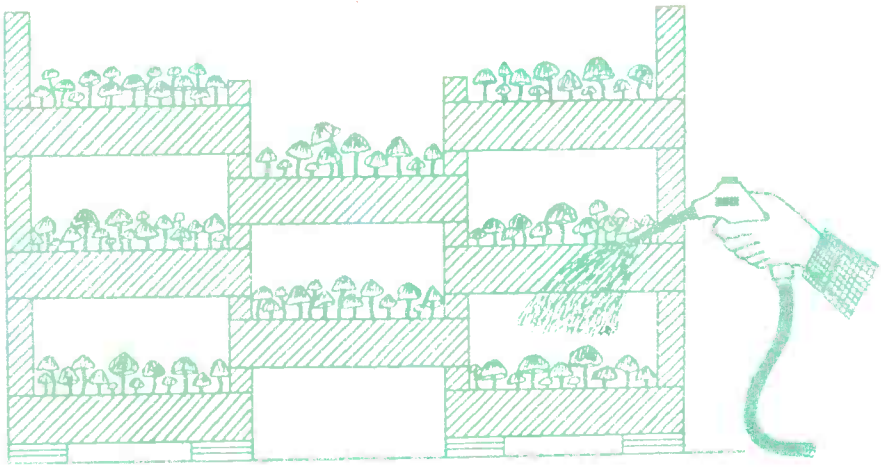
(a) **Temperatures :** During the period of spawn run air temp. of 21 to 24 degree centigrate should be maintained in spawn running room.

(b) **Humidity :** Mushrooms require high relative humidity for their development. During pasteurisation and spawn run it should be very close to saturation, whereas during cropping it should be 88-94%.

(c) **Ventilation :** Little ventilation is required during spawn-run and should be sufficient to change the air in the rooms once or twice a day. Ventilation should be increased after casing. The greatest amount of ventilation is required during cropping period.

(d) **Air-bed ratio :** This is the ratio of bed area to air space. 5 to 6 ft of air space per sq.ft.of bed area should be maintained.

(e) **Watering :** During spawn run the surface of the compost must be kept moist by watering the sheet of the newspaper covering the tray. The frequency of watering may be once a day or once in two days. After casing the casing layer must be moist



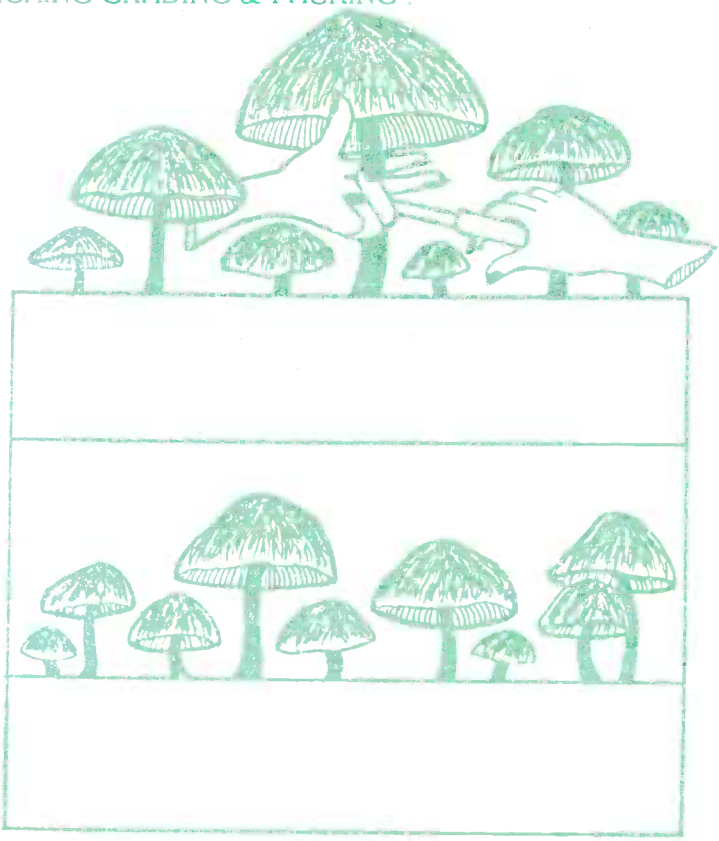
(Fig. 8)

throughout its depth. During cropping watering should only be resorted to when the size of pin heads have grown to a size of pea. Thereafter regular watering should be carried out. Watering should be carried out with the help of a spraying machine.

CROP PERIOD & YIELD : :

The time taken for mushrooms to be ready for picking after casing is around 17 days. Maximum crop is produced in the first six weeks. In a room of 200 trays a yield of 80-100 kg is expected. The cropping period should be ascertained by the fact that the winter season in the northen plains is very suitable for it.

PICKING GRADING & PACKING :



(Fig. 9)

Picking should be carried out when the cap of mushrooms is between one and two inches in diameter and the memberane is fully intact. Picking should be done in the early hours of the morning. One mushroom should be picked at a time with the left hand holding the mushroom between thumb and first two finger. By holding a knife in the right hand the root should be cut off at the soil level, and allowed to fall into the smaller portion of the box. Mushrooms should be washed before packing and should be spread out on a cotton sheet for atleast an hour, so that they are dry before packing. They should be packed in polythene bags which have small holes punched to allow for aeration. A pack should weigh around 200 gms.

Economic Viability : Though the yield varies, on a average a grower can get an average yield of 600 gms per sq. ft. of bed area and can sell his produce at Rs 100 per kg and earn a reasonably good profit. Spent compost is a very good manure and can bring in some additional profit.

VALUABLE HINTS :

(1) There are a large number of diseases which attack the mushrooms resulting in compelete or partial failure of crop. Though most of the disease causing insects are killed during peak heating at 50°C, for better prevention 1-2 ml Nuvan 100 EC in ten litres of water is sprayed.

(2) The composting area should be made of cement concrete or bricks. The area should be washed and sprayed with 2% Nuvan 100 Ec before and after composting.

(3) Windows and ventilators should have wire gauge screens to prevent insects from coming into the rooms.

(4) Workers engaged in spawing and casing should clean their hands and feet and wear clean shoes.

(5) Spent compost should not be dumped within a mile of the farm. A large number of diseases and pests are found in the spent compost which can readily infect subsequent crops.

IERT-CDRT-ISD-DIYS - 35

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