

GARDENING WITHOUT DIGGING
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This is intended as a discussion paper only, the author only having two years experience in gardening by the method described and is at this stage continually changing his approach to various aspects of gardening. There are no restrictions on copying this information.

Methods of gardening with minimal or no digging have been used for the home garden for quite a long time, of later years made popular by people such as Ester Dean. In 1965 "Victorian Compost News", a quarterly newsletter put out by the Organic Farming and Gardening Society has an article describing various methods of gardening without digging and names two people who had previously been using a no-dig method with lucerne hay as a mulch for the twenty years previous to the article having been written.

Lets start by giving a bit of thought to the natural situation. Dead leaves and other vegetable matter falls on the surface of the soil, this is broken down by bacteria or eaten by earthworms that may excrete it at a depth mixed with soil. A teaspoon full of healthy soil may contain about 150 million living bacteria, perhaps one percent by weight.

The soil is a living thing. Some bacteria breaking down vegetable material and making the nutrients available to plants, others secreting acids and various other chemicals that make minerals in the soil available to plants. There are protozoa that consume bacteria, often being an effective check on those that cause disease.

Plant roots penetrate, often deeply, into the soil and these roots are more than just a means whereby the plant takes up water and minerals. The plant roots secrete sugars and other substances which nourish bacteria that exist in a symbiotic relationship with the plant. The bacteria may protect the plant from antagonistic bacteria or they may make nutrients available from the soil

that would normally be in a form that the plant could not use them. Different plant species secrete different solutions and thus each produce differing cultures of bacteria around their roots.

As well as the great variety of microscopic life of the soil there are a variety of soil fungi. The microscopic life forms in the soil should be in balance and our gardening practices should be in harmony with this balance. If we dig in manure or organic matter we are upsetting the order.

When gardening without digging organic matter is placed on the surface as a weed suppressing mulch rather than being dug in. The surface is where organic matter accumulates in nature and its there that the bacteria are best able to break it down. Worms take it down into the soil below and the roots of the plants also help to add organic matter to the soil.

Starting the garden:

Its perhaps best to chip the grass cover from an area with a mattock or hoe before starting a garden but it can be started on grass if there is enough mulch to provide a good thick cover. When preparing an area be aware that the following plants if not removed can be a problem later - Dock, has a deep tap root and if this root is not removed the plant will continue to grow up through the mulch. Kikuyu grass should be removed from the site and burnt, a very invasive weed in any type of gardening. Couch grass is also a problem and also should be removed from the site. Onion grass, grows up through the mulch if the underground bulbs are not removed.

I clear an area, cover it with mulch and only use quick growing annuals as the first crop. When the crop is finished any persistant weeds are removed. Unless dock is going to seed it and onion grass are best removed after the first crop has come out. Dock has a long tap-root which must be removed and onion grass has an edible bulb which should be dug out. It is esential that any weeds that do come up are removed before they seed and if posible from now on only use a seed free mulch.

Having cleared the area now it's time to lay out the mulch. Mulches should have the following characteristics- Be as natural in origin as possible and as free of undesirable chemicals as possible. Free of weed seed. They should be of a fine enough texture so that they don't provide cover for slugs, snails and other pests but not so fine that they restrict air or water flow. As well as adding organic matter to the soil mulch suppress weed seed germination. If the mulch cover decomposes then weed seed will germinate so for this reason the mulch should be of a type that won't break down quickly. Also it must be realised that mulching is an on-going thing with areas to be mulched perhaps at least twice a year.

Hay or straw is excellent in many ways but can have many weed seeds in it. Second or subsequent cuts of lucerne is considered the best type of hay as it tends to have few weeds and being a legume has a higher nitrogen content than straw or grass hay. There could be advantage in spreading hay out in the chook run for a while to allow the chooks to eat any seed they can find. Wheat straw or oat hay that chooks have had access to may then be virtually seed free. Perhaps the best hay of all is pea hay. Experiments are about to be conducted on boiling hay in a 44 gallon drum to kill seed.

Hay can often be obtained from the animal pavilions after the local Agricultural Shows or may be available free if you can find a farmer who wants the loose hay cleaned out of his shed. From August till November is the time to watch for loose hay as this is when the sheds are most empty. Keep an eye on the place where farmers store round bales, after they have been fed to the stock there may be a residue of partially broken down hay remaining on the ground.

Other suitable mulching material could be-

Grass clippings: Careful of any from local tips. Many councils spray lawn clippings in the tip to prevent flies breeding in them. Lawn clippings break down quickly and this is a disadvantage for a mulch. Also lawn clippings are a

potential source of weed seed and if from an unknown source may contain either cooch grass or kikuyu. If transporting them any distance there is very little organic matter by weight. Lawn clippings have a high water content.

Sawdust: On its own not a recommended mulch, it tends to restrict water penetration and is very low in nitrogen. Sawdust has a very good organic matter to weight ratio and is often readily available. Its seed free and if from a sawmill free of undesirable chemicals. Being nitrogen deficient it will slow down the de-composition of lawn clippings and both compliment the other. Caution should be used with pine sawdust, perhaps in moderation and only then with strawberries. If any sawdust is used as part of the mulch then it may be advisable to keep a few legumes (peas, beans) growing in each rotation.

Pine needles: Excellent with strawberries which are native to conifer forests, good for blue berries and for raspberries. There are reports of pine needles having been used as the main mulch for no-dig gardens and if you live near a pine forest then it would be well worth doing some experiments. May create acid conditions or contain resins that harm some plants, however where I use pine needles to mulch strawberries the weeds that are there are still very healthy.

Sea grass, sea weed: Provides a good mulch that has all the desirable characteristics but if its from the Gippsland Lakes questions arise as to how chemical free it is. Leaves raked up in autumn would also be excellent.

I generally start a garden bed with a layer of hay, perhaps some compost mixed in with it and a layer of lawn clippings and sawdust on top. Potatoes can be planted directly on the bare ground below the mulch but the plants must have mulch added again when about 250mm high and care must be taken to make sure that the tubers are never exposed to light. To plant larger seeds such as peas or beans, part the mulch and put a hand full of compost on the bare soil and plant your seed in it, cover with mulch. The same for transplanting seedlings but let the foliage show through the mulch. Vegetables which require small seeds to be planted, such as carrots or pasnips can only successfully be

planted in an established bed.

If newspaper is to be used as an additional weed supressent then 2-4 sheets can be placed between the hay and lawn clippings/ sawdust.

For subsequent mulches a lawn clippings and sawdust mix is good or a seed free hay can be used. If you have a mulcher/shredder machine then you can make up some mulch with it. Wattle leaves are excellent shredded. It is intended to grow green manure crops of oats and either tick beans or broad beans over winter in vacant beds and use the crop as the initial mulch in spring.

There is probably a place for plain brown cardboard as a weed supressing mulch in the organic garden but I am wary of using newspaper with its ink. My information is that newsprint ink is a product known as "Carbon Black" dissolved in a solvent. Carbon Black is made from incineration of a variety of industrial wastes and if so could be expected to contain a variety of contaminants.

I use sawdust to a depth of about 100mm for the paths and when it breaks down add it to the mulch on the garden bed. I then put down a new lot of sawdust on the paths. This is a very effective way of adding orgnaic matter to the garden.

Fertilising and mineralising the soil:

Organic gardeners differ from others in their veiws on the use of many fertiliser. Its impossible to give an in depth explanation of the many reasons in the space available nor am I qualified to include anything but a few words of brief explanation.

Trends in agriculture have been towards providing adequate amounts of the major elements in a soluble form. ie; nitrogen, phosphorus potasium, calcium, magnesium, zinc, copper, molybdenum, boron, clorine, and sodium.

The problem with soluble fertilisers is that the plants tend to take up too much of certain elements, resulting in imbalances within the plant, which in turn affect the plants ability to resist fungal and other disease problems or even make them more attractive to insect pests. The imbalances within the plant may also mean that the plant is inferior nutritionally to organically grown produce. Providing elements in soluble form will in most cases upset the delicate microbial balance in the soil previously described. The use of synthetic nitrogen fertilizers reduce the nitrogen fixing bacteria's ability to fix atmospheric nitrogen.

The loss of the nitrogen produced by the nitrogen fixing bacteria is about proportional to the amount of nitrogen added. Any gain in vegetable growth results from an addition of nitrogen in excess of the amount that was initially being produced by the bacteria.

The addition of nitrogen by the application of synthetic fertilizers reduces the Vitamin C content proportionally, the greater the amount of fertilizer the less the amount of Vitamin C.

The addition of nitrogen by the application of synthetic fertilizers may cause plants to store quantities of nitrates and nitrites, this is particularly so with green leafy plants. The nitrates and nitrites have been associated with a number of health disorders.

Manure contains nitrogen in soluble form and I believe its use should be treated with caution and it only enters my garden through the compost heap and even then in very small amounts. Note the luxuriant growth around a cowpat and also note that grazing animals will avoid it.

Though hesitant to go against conventional wisdom I would question using such products as "Dynamic Lifter" or any other manure based product in a garden situation in anything but extreme moderation.

Superphosphate is avoided by organic followers because of its acidifying

effect. By lowering the pH of the soil it can cause some elements present in the soil to become unavailable to the plant. Superphosphate also has cadmium and fluoride in concentrations considered by many to be harmful. The latest news is that cadmium, a heavy metal more poisonous than lead is showing up in the food basket in increased concentrations and this has been attributed to superphosphate use. Superphosphate provides phosphorus in a soluble form and this is not recommended.

Organic management seeks to apply deficient elements in an insoluble form, so that the element is only slowly released to the plants through microbial action and other mechanisms.

Though rock phosphate is accepted by many within the organic movement some have questioned this as a possible source of cadmium and fluoride contamination. However there is a new product on the market that has a very low analysis of both these.

Organic followers favor dolomite over lime as dolomite adds magnesium as well as calcium. Though lime may be a cheaper way of neutralising acidity its use may lead to magnesium deficiencies.

Gardening without digging seems to provide a more natural environment for the many and varied lot of little critters that are a necessary and joyful part of the garden. There are a great abundance of ants whose nest would be destroyed if the ground were dug. Spiders and lizards abound, slaters who help the decomposition of decaying vegetable matter. The occasional frog is a joy when seen. Fruit trees, raspberries, brambles, gooseberries, grapes and other useful shrubs or vines should all be part of the over-all layout and combined with the vegies, there is no need to keep them all separate as properly laid out should complement each other. Trees and shrubs being more deeply rooted bring up minerals and make them available to other vegetables through the decomposition of their leaves that fall on the ground below. Strategically placed tall plants give pest controlling birds security. Perhaps a small pond or two, as this will attract dragonflies and increase the diversity of fauna

in many ways.

Learn what conditions each plant type likes and provide it in an overall design. Make each bed as diverse in its species composition as practicable while following companion planting convention.

Even poke in a few flowers and add a bit of color. Hover Flies, which in both larval and adult stage eat aphids, collect a small ball of pollen to lay an egg in so a few flowers about will attract them and help control aphids. Let a few of the veggies go to seed and perhaps save your own for future planting. If you want further information on gardening without digging feel free to ring me

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