

Introduction

A mulch is any material placed on the soil surface for the purpose of reducing soil erosion, insulating the soil surface, reducing evaporation of soil moisture or for weed control.

Crop residues left on the surface are a type of weed free mulch. Other materials which may be used include: straw, woodwaste, compost or plastic materials. Use of woodwaste is generally only recommended for blueberry production or in nursery container operations, although some is being used on ginseng gardens in Washington state. They use only fir sawdust as it comes with less of its own problems such as mushrooms or toxic leechate.

When mulches are used over the winter, soils do not warm up as quickly in the spring. This probably is an advantage for ginseng crops. Where hot, dry summers lead to high soil temperatures and high rates of evaporation, a mulch is effective in reducing soil temperature and evaporation. Organic materials used as a mulch will be slowly decomposed by soil organisms and the mulch will eventually become part of soil humus. When woodwaste or straw are used, their decomposition may result in some soil nitrogen deficiency for the crop, and it is recommended that some nitrogen fertilizer be added to the mulch to overcome this situation. The typical suggested rate of application is 20 to 40 kg/ha (18 - 35 lbs/ac) actual nitrogen (equivalent to approximately 1% N by weight of organic matter). Because the mulch is not incorporated or distributed it tends to break down fairly slowly in ginseng gardens and about $\frac{1}{2}$ of the above rate should be sufficient.

Mulching Beds

One of the more critical elements of ginseng growing, is the application and maintenance of a mulch layer over the ginseng beds. This is done to simulate the natural conditions of leaves and compost on the forest floor. As the industry learns more about cultural aspects, more emphasis is placed on mulch type, depth, evenness, etc. Too much mulch or not enough, can cause many of the same results over the long term — low plant populations. It is generally believed that approximately 5% of ginseng plants are damaged or disappear over winter with good conditions, so why aggravate this with inadequate or excess mulch cover.

Straw Type

Every grower has a preference as to the type and depth of straw that is right for their garden. Over the years, barley straw has become the choice of many growers, as it doesn't break down as fast and gives a more open pattern for new plants to emerge through. Oat straw once preferred has been down graded because it is very slippery and slides off the beds before it can settle in. Wheat straw is used by many as a second choice.

Mulch Security

One technique used to hold newly applied mulch in place is to allow the grain left in the mulch to grow through the mulch and when it freezes it falls over and holds the mulch in place over winter. Two things have to occur for this to happen, one is that there is 'volunteer' grain in the straw and two is that the mulch is placed early enough in the fall so it can grow. It is a practice of a few to broadcast annual rye or oats at approximately 20 lbs/ac over the beds before mulch is spread to ensure this mulch holding technique will happen evenly and with enough volume to work.

Weeds in Straw Mulch

Clean straw is an important issue, apart from the grain that is left in it. Weeding is a major cost to this industry and dirty straw (weed seed contamination) can be a very expensive problem. You should go and see the field your straw is coming from or purchase from a dealer you know is careful in his selections.

Value of Mulch

What value is mulch on a ginseng garden? The greatest value is in keeping winter soil temperatures constant and higher than they would be without it. Ginseng roots can handle soil temperatures to -4 or -5°C without apparent damage. Our soils here in the winter under an even mulch are in the range of -2°C as a low so we are not far from the critical level. The head or top of a young root is often at or near the surface where temperatures are the coldest so a good straw cover is important. Older roots seem to pull themselves into the soil so are not as vulnerable as young roots.

An even layer of straw will also reduce weed populations to some extent and will totally eliminate some weeds such as liverworts, mosses, etc. Straw also reduces soil surface evaporation, eliminating in some cases the need to water or at least not as often.

Lack of mulch will cause a negative effect on the garden in all of the above situations, colder soil temperature, more weeds and more evaporation of water. It is recommended that a minimum of 5 cm (2") of mulch is kept on the gardens and a maximum of 10 cm (4") be allowed to accumulate. If you wish to have 3 inches of straw mulch you initially need to put on 5 to 6" of loose material as the above measurement is after it has settled down, not immediately after spreading. Seedlings can emerge through about 4" of straw without a problem but after that they will become weak or not emerge at all. Straw that is spread with clumps in it must be corrected. These are dense parts of a bale that don't break up properly and will inhibit new plants from emerging. Good clean, dry straw will spread the best and if straw is stored from year to year should be covered.

Mulch Facts

- Clean, new dry straw spreads the best.
- You need as even a distribution as possible and this is probably best achieved with small square bales, although the labour factor increases quite significantly.
- You want long fibres in the straw so it will not pack on the bed, so **do not** purchase straw that has gone through a rotary combine as it is ground up very fine and will mat on the bed surface.
- Apply more mulch in the second year if necessary, especially if a light application was made the first year.
- Mulch is a carrier of disease spores as are old ginseng plant stems. If a disease problem exists removing all the straw and stems, and spraying soil with an appropriate fungicide before replacing the straw may be beneficial. The application of fresh straw will eliminate a great deal of the reinfection problem.

Note: *This is only practical in small gardens where there was a heavy infestation of foliar disease — especially alternaria.*

- Straw from winter wheat and/or fall rye should not be used as the plants from 'volunteer' grains will not die with frost but rather live over winter, form massive root systems over this time and grow very quickly in the spring.

- Applying some straw the first fall and more the second fall will allow the seeds easier emergence in the spring. There has to be enough though to keep the soil surface moist so seed does not dry out over the first winter.

Spreading straw is almost always mechanically done. There are machines to handle all types of bales and companies who will do custom work.

Sawdust Mulches

Some growers in Washington State are using fir sawdust (other types have not proven effective for various reasons). The best type is granular in texture rather than fine (powdery) or coarse (shavings, chips, etc.). They use about 1.5" over seedlings and up to 4" over older plants. Advantages claimed by them are, few weeds and no slug problems. The volume of this product needed and the cost, if it is available here in British Columbia are probably prohibitive but for very small gardens it may be a choice.

Sources of Straw

There are established sources of straw in the industry and the main criterion is that it is weed free. Most suppliers go to Alberta (mainly) and check the fields. Unharvested grain in the heads is acceptable but not weed seeds. For other mulches it is recommended you do some trials for this climate. It may also be hard to get fir sawdust as most of this goes to the pulp mills. In any case it would have to be found locally.

In 2002 there is a concern over the cereal leaf beetle so straw from certain areas of British Columbia and USA is either not allowed or has to be fumigated. Check with the Canadian Food Inspection Agency for the most recent rules:

Kelowna - 250 470-4899
New Westminster - 604 666-2062

Note: *Do not purchase straw that has been combined by a rotary combine as it will be too fine textured and will mat.*