

## JOHN'S CORNER

### SOIL AMENDMENTS - VERMICULITE

*By John Ferguson*

I was starting to think about writing this article on vermiculite and remembered that I have not used vermiculite in many years due to issues with asbestos. Hence I thought I was going to have to write a very negative article on the subject. However after reviewing all the recent literature, going through my textbooks and journals plus reading reports published on the internet, I have good news. Vermiculite today is much safer to use!

Vermiculite is a natural clay mineral that has a layered structure with water molecules in between the layers (a hydrous silicate mineral often classified as a phyllosilicate). It developed a very bad reputation back in the 1980's when the major source of vermiculite in the USA was found to contain dangerous forms of asbestos.

For many decades almost all vermiculite sold in the USA and 80% of the world's supply came from the Libby mine in Montana that is owned by the W. R. Grace company. It was found to contain a very dangerous form of asbestos known to cause cancer and other health problems. According to numerous reports, the Grace company actively covered up the dangers of their product for years. As a result of all the investigations, lawsuits and governmental sanctions, the mine was shut down in the early 1990's.

Today most vermiculite comes from Africa and with several mines in South Carolina and Virginia, and a few others around the world that ALL have tested asbestos free.

Vermiculite ore or rock is formed by the weathering of minerals known as biotite or phlogopite for you geologists out there. The name comes from the Latin vermiculare, to breed worms describing the way it expands (exfoliates) when heated. The ore is crushed to various sizes and then heated which causes

the water to evaporate and expanding the mineral layers. When rapidly heated to high temperatures 1,600 degrees Fahrenheit (870 degrees Celsius) the vermiculite expands 8-30 times its original volume creating a lightweight product that has accordion-shaped particles composed of many layers. The color of vermiculite is often brown or tan but can be bronze-yellow or even green depending on the source of the ore. The pH is normally near neutral but can be very alkaline depending on the source of the ore and the other minerals in it like limestone. Vermiculite has a very high CEC (cation exchange capacity) hence it can hold plant nutrients very well and prevents them from leaching into the environment causing pollution.

Vermiculite is used in dozens of commercial and industrial applications from brake linings, to swimming pools, insulation, and fire resistant products to name a few. In horticulture it is used as a component in growing media, a packing material to store bulbs, a substrate to grow fungi and in hydroponics.

Coarse ground vermiculite:



Fine ground vermiculite:



Positives:

It is relatively permanent, clean, odorless, non-toxic, sterile, does not rot away, holds plant nutrients well, lightweight, easy to handle and mix. Cuttings root easily in it and seedlings can be removed for transplant without danger of them breaking up as they are removed. Due to its high water holding capacity it makes a great material to store bulbs (or root crops) as it absorbs any moisture and prevent the bulbs from rotting (finely ground vermiculite can hold up to 500 times its weight in water).

Negatives:

In low pH (acid) environments it may release aluminum (Al) into the soil and be toxic to plants. The structure of expanded vermiculite collapses easily therefore it is not suitable for long term applications. It can be dusty and as with any dust regardless of the type it is best not to breath it.

It is a semi-sustainable product requiring mainly the energy to make and transport it, and the Earth has billions of tons of it.