Geophysical Research Abstracts
Vol. 14, EGU2012-2413-1, 2012
EGU General Assembly 2012


# Biochar in viticulture

C. Niggli and H.-P. Schmidt
Delinat Institute, Arbaz, Valais, Switzerland (niggli@delinat-institut.org)

Viticulture is becoming the pioneering culture for biochar research. Biochar has been applied to many large-scale viticulture experiments across Europe this spring. After the first large-scale and long term experiments at the Delinat Institute in 2007-08, expectations are high. The latest results confirm these expectations and also show that only scientifically sound experiments will lead to conclusive information on the effect of biochar on vine growth and wine quality in many different climates and soil types.

In the last three years it has been clearly shown that biologically activated biochar does not only have positive impact on soil-plant systems in the tropics, but in all soil types and climatic zones [Crane Droescher [2011], Ogawa [2010], IBI [2011]). While biochar improves water availability for plants and microorganisms in dry or seasonally dry farming areas, it also plays a substantial role in high rainfall zones because it improves nutrient dynamics through prevention of nutrient leaching.

Spectacular crop growth can be seen in extreme climates (tropical or semi-desert), partly due to biochar's buffering capacity leading to the compensation of strong limiting factors (water in semi-deserts, washed-out nutrients in the tropics). In temperate climates, however, the achievable increase in harvest is lower as there are no extremely limiting elements which have to be compensated. In addition, potential maximum growth of many plant species is easily reached in temperate zones through using good fertilizers and careful seed selection. Therefore the advantage of biochar application in temperate climates is less evident as crop growth but rather is seen as plant quality improvement through optimizing plant nutrition.

1. Increase of plant resistance and hence reduction of plant protection products
2. Stimulation of soil microbial activity and symbioses between plants and soil organisms
3. Reduction in fertilizer use by optimizing the supply of nutrients, limiting nutrient losses
4. Improvement of taste and nutrient content of the crop
5. Improvement of shelf life
6. Reduction of greenhouse gas emissions and groundwater pollution

Biochar is not a fertilizer, but rather a nutrient carrier and a habitat for microorganisms. If biochar is incorporated pure and without activation into the soil, its high adsorption capacity and increasing CEC will result in the absorption and fixing of available nutrients and water in the soil. This may lead to inhibition of plant growth, at least in the beginning (several months to a year), depending on the soil's nutrient content. Biochar needs to be charged to become biologically active in order to efficiently utilize its soil-enhancing properties. There are numerous methods of activating and producing substrates similar to terra preta aside from mixing biochar with compost. A new field experiment has been established in the vineyards of Delinat-Institute in 2011 to study the effects of biochar incorporation into compost preliminary to the composting process. Other field trials with manure-activated biochar were conducted this year by more than 15 companies in several major wine regions in Europe and first results have been evaluated.