

Erosion control in orchards and vineyards by a new soil and cover crop management method

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Cover crops are the basis for an erosion-free soil management in orchards and vineyards. The soil cover provided by the foliage and the intensive root formation counteract erosion. Cover crops provide the soil microfauna with fresh organic matter which improves soil structure and porosity. The water demand of cover crops, however, may pose problems for the water supply of the trees and vines in dry seasons. Therefore it is necessary to adjust the growth of the cover crops to the actual water conditions.

In years with ample precipitation cover crops may be allowed lush vegetative growth till flowering and formation of seeds. In dry years, the growth of the cover crop must be restricted to stop the competition for water, sometimes even by cutting off the cover crop roots. The course of the weather is incalculable and rainfall may be very variable during the year, so it is sometimes necessary to adjust the cover crop management several times a year.

A new special equipment, which can perform all the tasks necessary for the flexible cover crop management has been developed together with the agricultural machinery manufacturers Bodenwerkstatt Ertl-Auer GmbH and Güttler GmbH. The GreenManager[®] device consists of three modules, namely a specific type of cultivator, a harrow and a prismatic roller with seeding equipment, which can be used separately or in combination.

The GreenManager[®] can reduce cover crops by flattening the plants in the whole row middle, by bringing down the cover crops with the harrow, or by horizontally cutting the cover crop roots a few centimetres beneath the soil surface in the central part of the row middle or in the whole row middle. These measures reduce the water competition by cover crops without generating further losses of soil moisture through intensive soil cultivation. At the same time the risk of soil erosion is kept to a minimum, because the soil remains covered by dead plant biomass.

In one passage the GreenManager[®] can direct-drill large-grain cover crop seeds and simultaneously cut the roots of the standing vegetation in the row middle, plus at the same time sow small-grain seeds over the whole middle. The large grains are placed several centimetres deep with the cultivator, while the small grains are spread on the surface in a seedbed prepared by the prismatic roller or the harrow module. So it is secured that on rewetting of the soil the next generation of cover crops will be established straight away.

In all cases, however, the soil remains covered with living or dead plant biomass, so that the erosion risk is minimized. Uppermost goals of the flexible cover crop management are the well-being of the fruit trees and vines and maximum erosion protection of the soil.