Summary 157

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Alternative soil management for sandy vineyards

By: László Némethy

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• The sustained mechanization practiced in many Hungarian vineyards with sandy soils has caused an important decrease in soil quality, due mainly to loss of structure, depletion of nutrients, and compaction by machinery. On the other hand, herbicide use does little to solve the increasing environmental pollution problems. The goal of this study was to find some environmentally-sound alternatives that would enhance soil fertility and moisture retention.

• The authors compared the following treatments:

1) winter rye, mowed and used as mulch
2) winter rye mixed with shredded vine prunings used as mulch
3) permanent native vegetation, mowed 5-8 times
4) cover crop consisting of *Digitaria*
5) straw mulch (9-10 kg per square meter)
6) control = cultivation with machinery

• Researchers measured *soil moisture* at 0-60 cm of depth by collecting samples and determining water content, and measured *soil penetration resistance* - a measure of compaction – using a soil electrometer.

***Digitaria ciliaris* (Henry's crab grass)**

• **Results.**

Moisture content:

1) The most favorable soil moisture every year was found with the straw mulch [authors do not mention here how many years were involved).
2) Among the treatments with a cover crop, the best moisture was that of the *Digitaria* plots, followed by the rye. Mechanical cultivation -the control- came next, and the native vegetation had the lowest moisture. *Digitaria* performed best because it was able to retain night dew, yet the vegetation was short enough (10-20 cm, or 4-8") to require a minimum amount of water.
3) When the authors tested which height of the native vegetation maximized soil moisture, they found that high stubble (20-23 cm) or low stubble (5 cm) had low moisture, but intermediate-length stubble (12-15 cm, or 4.7-5.9") had the most favorable soil moisture, probably because of an equilibrium between blocking enough sunlight yet not using too much water.

Penetration resistance:

4) Resistance of the soil covered with straw was 60% lower than that with a cover crop, or the tilled soil.
5) Resistance in the tracks of the machinery was 2 to 2.5 times higher than the rest of the interrow. After loosening the interrow soil with a subsoiler, these high penetrometer resistances were reduced by 40-45%.

In conclusion, by replacing mechanical tillage with a straw mulch, soil moisture was increased and soil compaction was reduced by half. Among the few cover crops compared, *Digitaria* performed best, with low evapotranspiration and no need for mowing throughout the season. Subsoiling the wheel track area is a very effective way of eliminating compaction in the interrows.

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