



Ruben and Donato "sample" the soil



Sa Greppaccia vineyard, May 24th 2021: every year in spring, Donato Ciofini, Sa Violla's biodynamics expert - with "our" Ruben, his right-hand man - goes round the fields we cultivate, collecting a spadeful of soil here and there. Sounds strange? The health (and goodness) of the crops is inescapably linked to the soil's natural fertility; it may seem anachronistic in the 21st century, but that's the way it still is and always will be. What Donato does is known as the "spade test". It accompanies routine sampling to compare the soil's analytical parameters (organic matter, humus, potassium, phosphorous, zinc, copper, cation-exchange capacity or CEC, absorption capacity, etc.) over time. Visual assessment of the soil dug up with the spade offers an expert eye a first impression of the ground's state of health, that's to say its permeability to water, air and roots, the presence of wild plants, insects and worms; the colour and odour are fundamental too... so, let's follow Donato and Ruben (see page opposite).*

* This test has always been used and has recently been codified by the universities of Florence and Pisa, and by the Research Institute of Organic Agriculture (FiBL).



- ① **Sampling:** the locations in which samples will be taken over time are mapped out. The perimeter is scored with the blade and the spade is pushed into the soil to a depth of about 30 cm. The sample must be extracted without breaking it up.
- ② **Visual assessment:** dark colour, round soil crumbs, good aeration, worm holes, extensive presence of roots, flora and fungi are all positive elements. Are the edges of the sample rounded or sharp? Sharp edges indicate that the soil is too compact and therefore lacking in vitality. More generally, the soil should be “loose”, to allow roots and microorganisms to develop and permit elements found in the air to penetrate. Lastly the lump of earth is dropped from a height of one metre, to see how it breaks up. Donato comments: “this earth has a good structure with lots of crumbs, which indicate soil that isn’t compacted and has plenty of air for the roots and soil organisms; in addition, these crumbs remain well anchored to the plants’ root systems, with intense microbial activity”.
- ③ **Olfactory assessment:** the odour should immediately recall the aroma of woodland floor or potting soil, moss and mushrooms. This is synonymous with lively soil, full of fertile humus*. Negative signs, on the other hand, are a compact lump of earth that doesn’t break up, or soil with grey and blueish nuances, which indicate asphyxia and pathological decomposition (e.g. hydrogen sulphide, acetic acid).
- ④ **Tactile assessment:** this test is used to verify the soil’s texture. If it crumbles it’s sandy; if it can be rolled into very thin “spaghetti” without them breaking, it’s very clayey; if the “spaghetti” break up when they’re still thick, the texture is well-balanced and the soil is “loamy”.
- ⑤ **Documenting:** the data collected is recorded, in order to monitor changes in the parameters over time, and compared with the numerical results of the biochemical analyses.

* **Humus**, from the Latin word meaning “earth”, is the most fertile part of soil. Land that is cultivated well, and not exploited, continuously generates a process of breakdown and reconstruction of **organic matter**, which is transformed, concentrated (in carbon and other base elements), becomes darker – dark brown/black – more stable and less prone to erosion; it’s found in great quantities on the forest floor. Humus and organic matter aren’t exactly the same thing: soil organic matter is made up of living biomass (roots, plants, microorganisms, insects, fungi, etc.), dead biomass (decomposing plant and animal residues) and humus. Humus is the most stable and fertile part. To find out more on the subject please visit

<http://www.lavialla.com/fertilesoil>

La Greppaccia vineyard



Casa Comforto vineyard



El Ronco vineyard



Casalduero vineyard



Soil: the “factory” of life

The layer of soil that contains the majority of the organisms that live in the ground is only about 30 cm deep. While it's true that the roots of plants, with their accompanying vital ecosystem, can reach many metres below the surface, the vital layer, in which the organic matter is concentrated – in particular the fertile part, the humus (see note on page 11) – is the one at the top, closest to the air. More than 90% of our planet's food is produced thanks to this very thin, delicate “film” that covers it. Scientists estimate that up to a quarter of all terrestrial species live in these 30 cm. When this layer is healthy it's fundamental for the entire ecosystem of the Earth: it feeds plants and animals (including man!); decomposes organic waste matter and turns it into new fertile soil; regulates humidity in the environment and the flow of carbon (trapping CO₂ from the air in the ground); controls the percolation of water down into groundwater, purifying it – as best it can; breaks down harmful substances; avoids soil loss due to erosion and runoff; contributes to hydrogeological stability. And last but not least: it's a joy to be able to admire a colourful meadow or a lush forest...

What does La Vialla do to improve soil fertility?

The greatest challenge is trying to accelerate the improvement of soil fertility and biodiversity. To accomplish this, biodynamic agriculture is the ultimate expression of good agronomic practices. It encompasses organic agriculture (crop rotation, green manuring, no use of chemical pesticides and fertilisers) and broadens its possibilities enormously with the use of biodynamic preparations, animals grazing on the land, composting, reduction of mechanical processes, aeration of the soil by sowing suitable species and, in the long term, reduction of human and mechanical intervention.



Measuring the fertility of La Vialla's soils

One of the indicators most frequently used in biodynamics to measure soil fertility, is the level of organic matter, which is expressed as a percentage. Soil organic matter is composed of all the organic substances of animal and plant origin: the more there are, the more fertile the soil is. The organic matter content varies from less than 1% in very sandy soils, to average values of between 1% and 4% in agricultural land, up to 10% in forest soils – above all in mountain environments – and over 90% in peatlands. *When agricultural land is cultivated using conventional methods (and therefore exploited), its organic matter decreases over time; on the contrary, careful organic-biodynamic management not only makes it possible to avoid impoverishment of the soil (which is already very important), but also to enrich it – the opposite of exploitation!*

La Vialla monitors the levels of soil organic matter (and the other indicators) annually and compares the trends over time. The table below shows an extract of the analyses carried out over the last 5 years (by “Laboratorio Chimico-Biologico Srl”, Sansepolcro, Arezzo), regarding some of the land on which the Fattoria's vineyards are located.

Vineyard	Type of Soil	% Organic Matter in the Soil		Variation
		2015	2020	
La Greppaccia	Alluvial soil, originating from the breakdown of marly sandstone, predominantly sandy and silty; sandstone and limestone skeleton – neutral pH tending towards alkaline – good cation-exchange capacity, resulting in good assimilation of microelements – medium to low active limestone	1.12	1.64	+46%
La Casotta	Soil originating from the breakdown of marly limestone, of medium texture with a prevalence of sand and clay; widespread presence of limestone skeleton – neutral pH tending towards alkaline – good cation-exchange capacity, resulting in good assimilation of microelements – medium to low active limestone	1.47	1.94	+32%
Il Ronco	Alluvial soil, originating from the breakdown of marly sandstone, of medium texture with a prevalence of sand and silt; sandstone and limestone skeleton – pH tending towards alkaline – good cation-exchange capacity, resulting in good assimilation of microelements – medium to low active limestone	1.55	1.72	+11%
Casa Conforto	Alluvial soil, of medium texture, with a prevalence of sand and clay; limited presence of sandstone skeleton – pH tending towards alkaline – good cation-exchange capacity, resulting in good assimilation of microelements – medium to low active limestone	1.38	1.90	+38%
Casalduro	Soil originating from the breakdown of marly shale and sandstone, with a prevalence of sand and clay; widespread presence of limestone skeleton – neutral pH tending towards alkaline – good cation-exchange capacity, resulting in good assimilation of microelements – medium to low active limestone	1.59	2.20	+38%
Spedale	Soil originating from the breakdown of marly shale and sandstone, with a prevalence of sand and clay; widespread presence of limestone skeleton – neutral pH tending towards alkaline – good cation-exchange capacity, resulting in good assimilation of microelements – low active limestone content	1.99	2.50	+26%
La Vialla	Alluvial soil, of medium texture, with a prevalence of sand and clay; limited presence of sandstone skeleton – pH tending towards alkaline – good cation-exchange capacity, resulting in good assimilation of microelements – medium to low active limestone	1.12	1.47	+31%