Implementation and results of the biodynamic preparation prepared 500 (500P)

Biodynamic Research Conference
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Dornach

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www.biodynamie-services.fr/en
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The creation of living and colloidal humus is the basis of soil fertility and the evolution of the Earth.

Many soils in Europe have lost 1 to 2 percent or even more of organic matter in recent decades.

Increased levels of humic organic matter in the soil provide numerous agronomic benefits (structural stability, higher water content, supply of macro and micro nutrients, protection against erosion and leaching, compaction resistance, etc.).

It also permits water retention in the soil which is important for water regulation during heavy rains and better drought management and may even help limit rising sea levels.

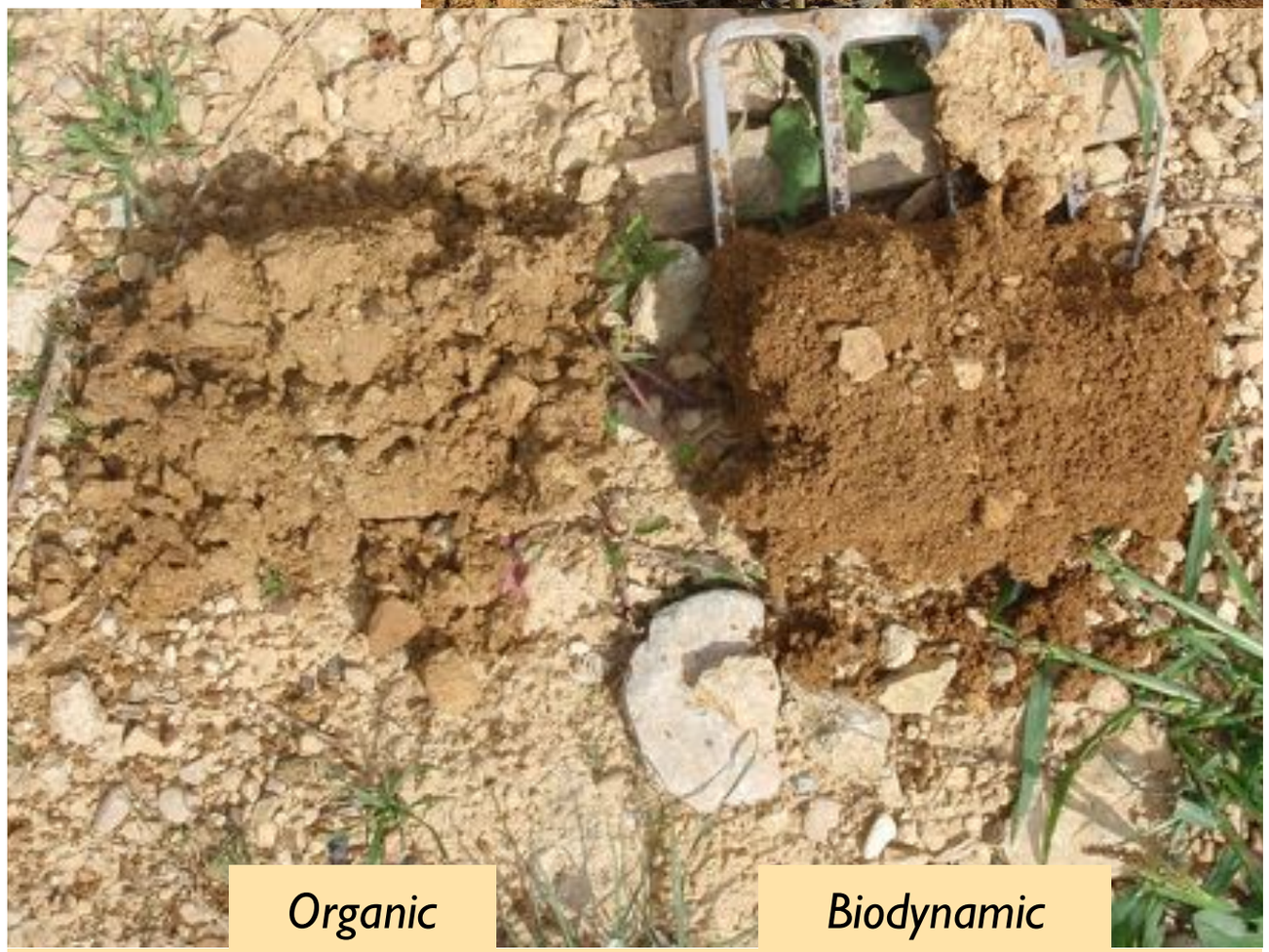
Improving the storage of carbon in soils is a fundamental contribution to controlling climate change.

What positive contributions can biodynamics make with regard to these major issues ?

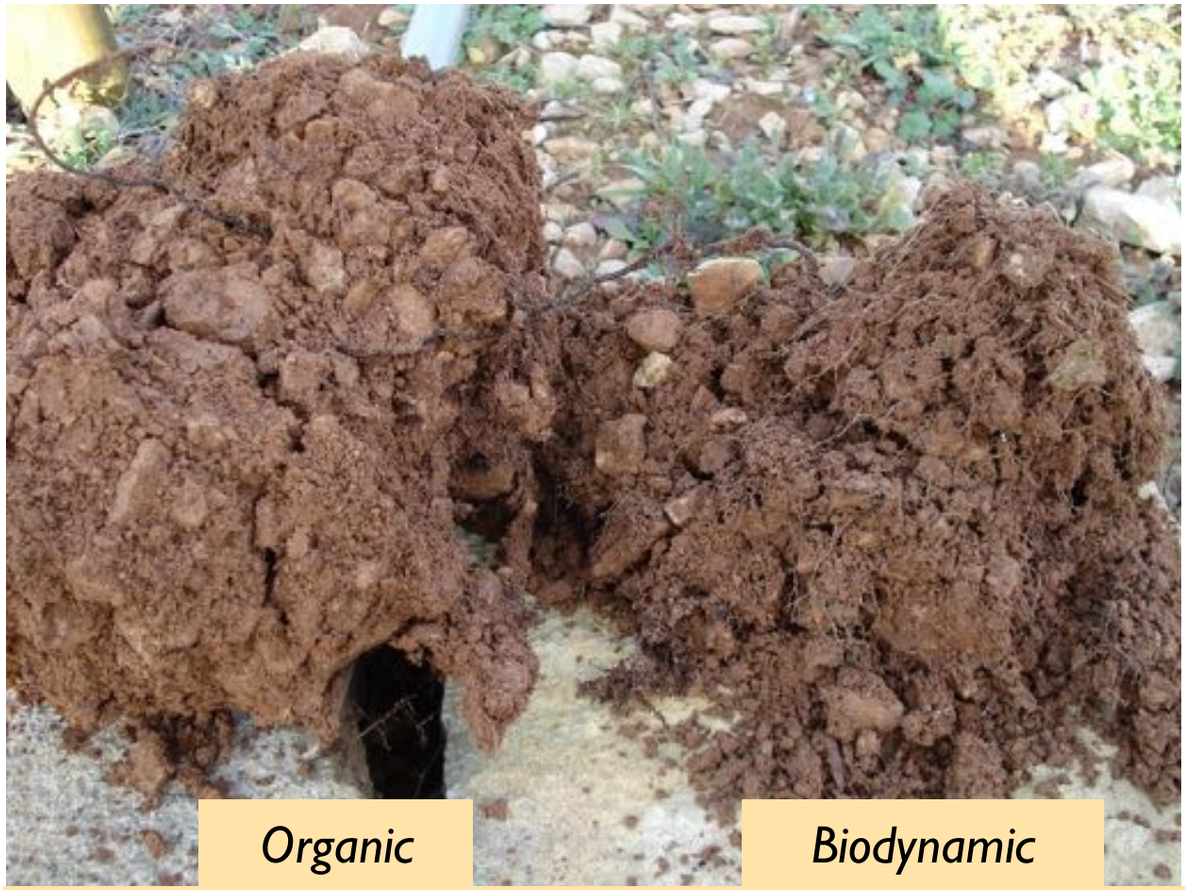
When the biodynamic preparations are used correctly, particularly 500P, soil transformation is noticeable. Results can be obtained in a few years' time or even shorter periods of time, even within a single year or less.

First pictures where taken by Pierre Masson from the early 2000's.

Biodynamic soil on top
Conventional neighbor
2004

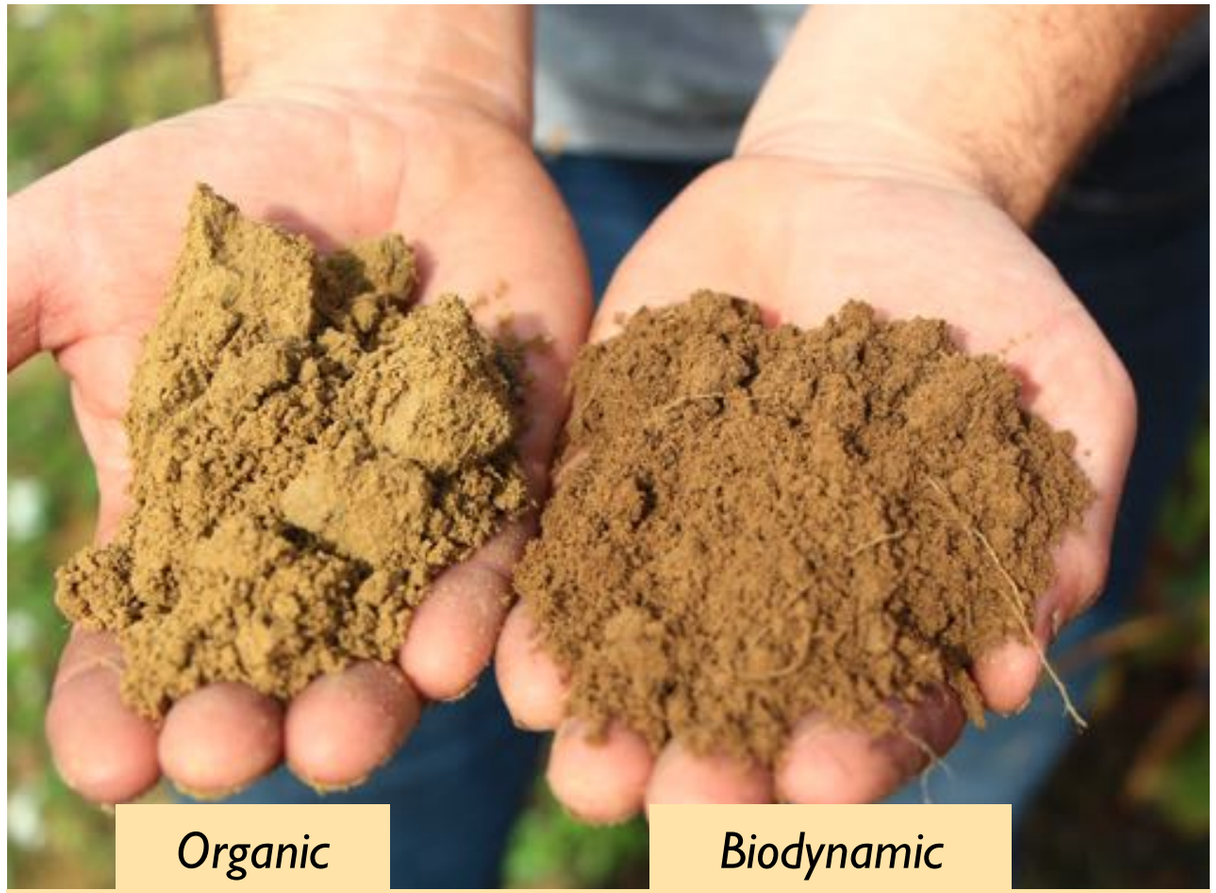


Cortons (Burgundy) 28/08/2009
Domaine Bonneau du Martray
Comparison of organic/biodynamic (with 500P)
over a 5 year period



Organic | Biodynamic

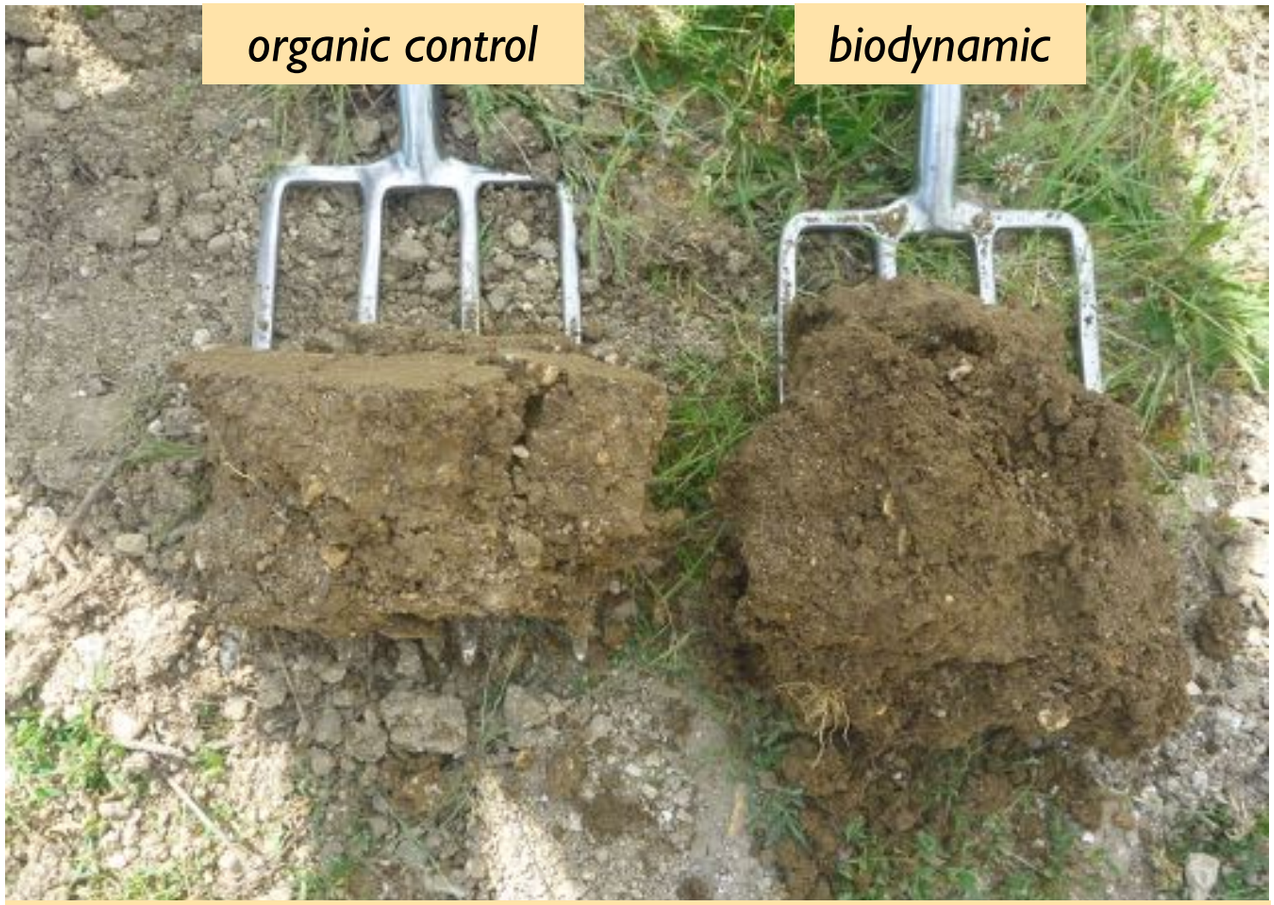
Comparison organic-biodynamic
Burgundy Février 2007
Domaine Bonneau du Martray
2 years of biodynamic practice with 500P



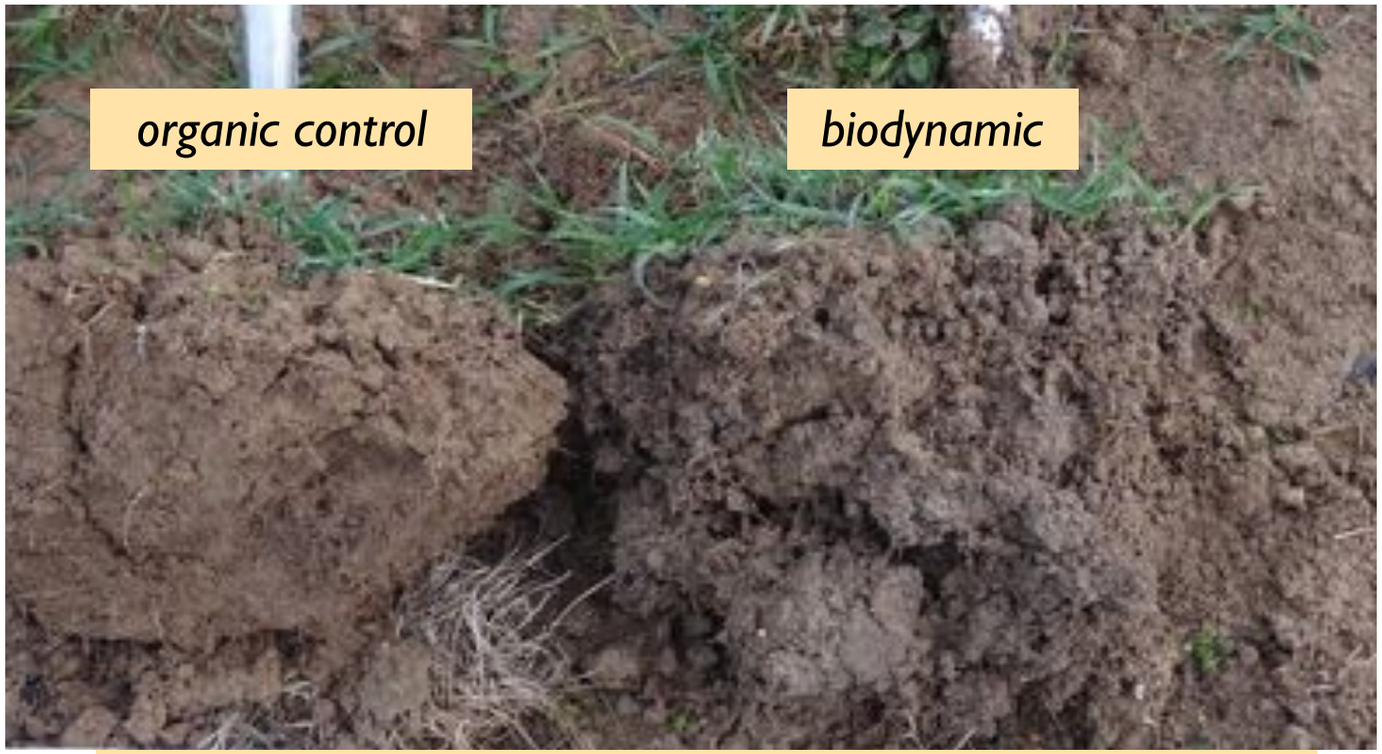
Organic | Biodynamic

Comparison organic-biodynamic
Châteauneuf-du-Pape 2014
Domaine Raymond Usseglio.
2 years of biodynamic practice with 500P

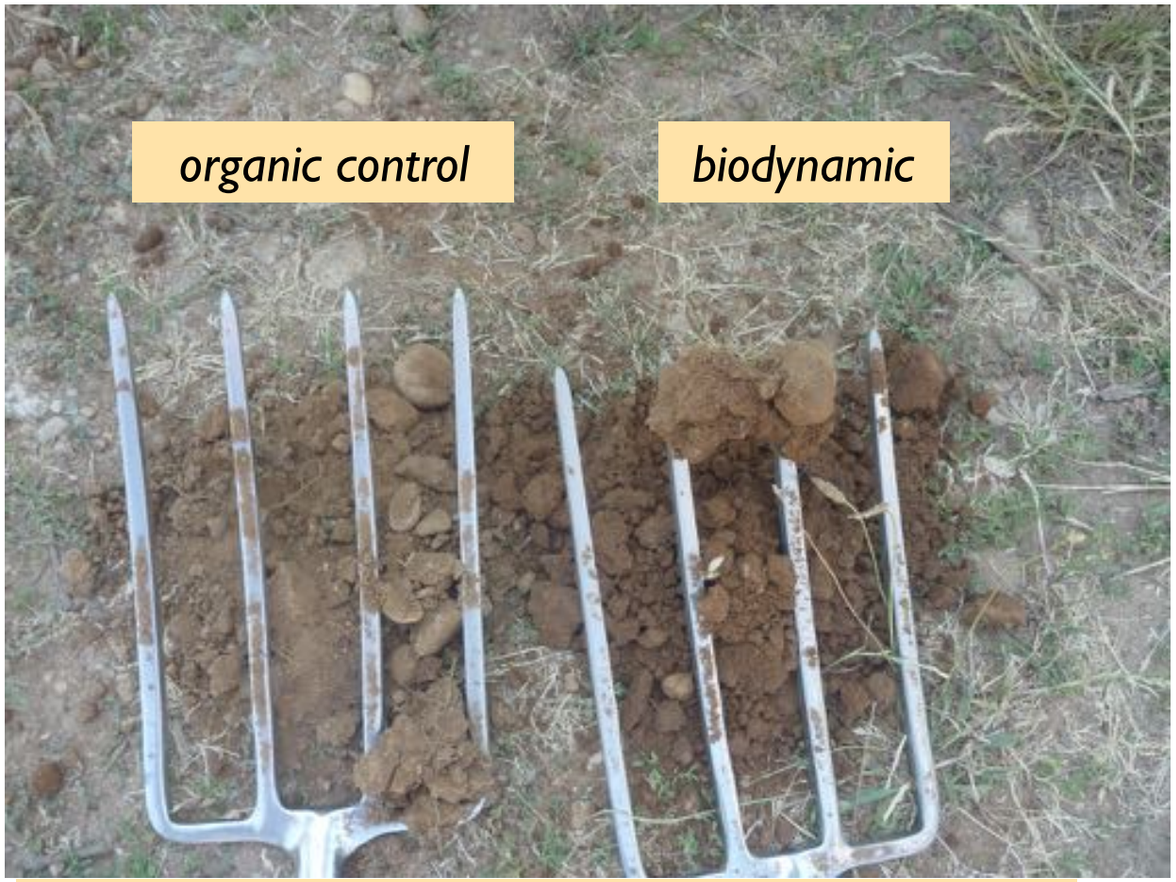
Bordeaux - Chateau de Pez Saint Estèphe - March 2011
One year of BD practice with 3 applications of prepared 500 (500P)



Champagne, Damery, 1st year of biodynamics with 500P and organic control (left). June 1st 2017



- *First spray of 500P on October 21st 2015*
- *Picture taken on December 16th 2015*



June12th 2017, Rhône Valley
2 x 500P in April 2017

Biodynamic viticulture trials 2014

Mâcon (Burgundy - France)
Domaine Delphine and Sebastien Boisseau

In 2000, all chemical weeding was stopped. From 2002, chemical treatments were abolished.
The whole of the vineyard has been run organically from 2003 and certified organic in 2006.
Organic and agronomic management of this vineyard is exemplary.
First applications of biodynamic preparations in April 2014 on 3 hectares.

Methods and Equipment

- *110 litre-capacity copper stirring machine (Australian type) with rhythmic reversal by sensor (Ecodyn).*

- *Use of spring water (from granitic spring) or rainwater stored concrete tanks treated with tartaric acid.*

- *Heating of water by coil to 36 - 36.5 before stirring.*

- *Copper back-pack sprayers used for manual spraying.*

Stirring machine

Spray equipment

Preparations

- *Prepared Horn Manure - colloidal 500P, carefully stored by the moist method. 100 grams stirred in 35 litres of water per hectare.*

- *Horn Silica - 501 made from quartz crystals collected at high altitudes in the Alps and finely ground to a colloidal state. 4 grams stirred in 35 litres of water per hectare.*

Storing box

Work with cosmic rhythms, recommandations :

- *No restrictions with regard to planetary positions in the sidereal cycle.*
- *Imperative : No work with the biodynamic preparations during nodes and eclipses.*
- *For 500P: Stirring started after 5 pm*
- *For 501: Stirring started from sunrise*
- *Attention to agronomic conditions : 500P applied on warm and slightly damp soil.*
- *501 was used according to plants' needs and their physiological development (before flowering and before harvest).*

Calendar of biodynamic applications - 2014

- *508 Horsetail decoction (Equisetum arvense) 9 April: Moon in Cancer (leaf day, 6 days before the full moon at Easter).*
- *500P. 17 April: Moon in Libra (descending flower day). Spring water from granitic spring used for stirring.*
- *Applications of 501:*
  20 May : Moon in Capricorn (ascending root day). Rainwater used for stirring.
  27 August : Moon in Leo (descending fruit day). Rainwater used for stirring
  6 September : Moon in Capricorn (ascending root day). Rainwater used for stirring.
- *500P in the autumn, after the grape harvest.*

Visit on two different plots :
A young plantation and an adult chardonnay vineyard.

Young plantation

Chardonnay vineyard

1x500P on April 17th 2014

Farmers observations (June 11): « The grass grows faster and is stronger on the BD side, the tractor drives like if in snow, I need to lift the implement because it goes too deep in the soil. »

June 11th 2014

Biodynamic part : the soil is darker brown. The plants easier to see.

Organic part : soil light brow. The plants are difficult to see.

Biodynamic

Organic

Young plantation from the spring


June 15th 2014
Biodynamic
Organic

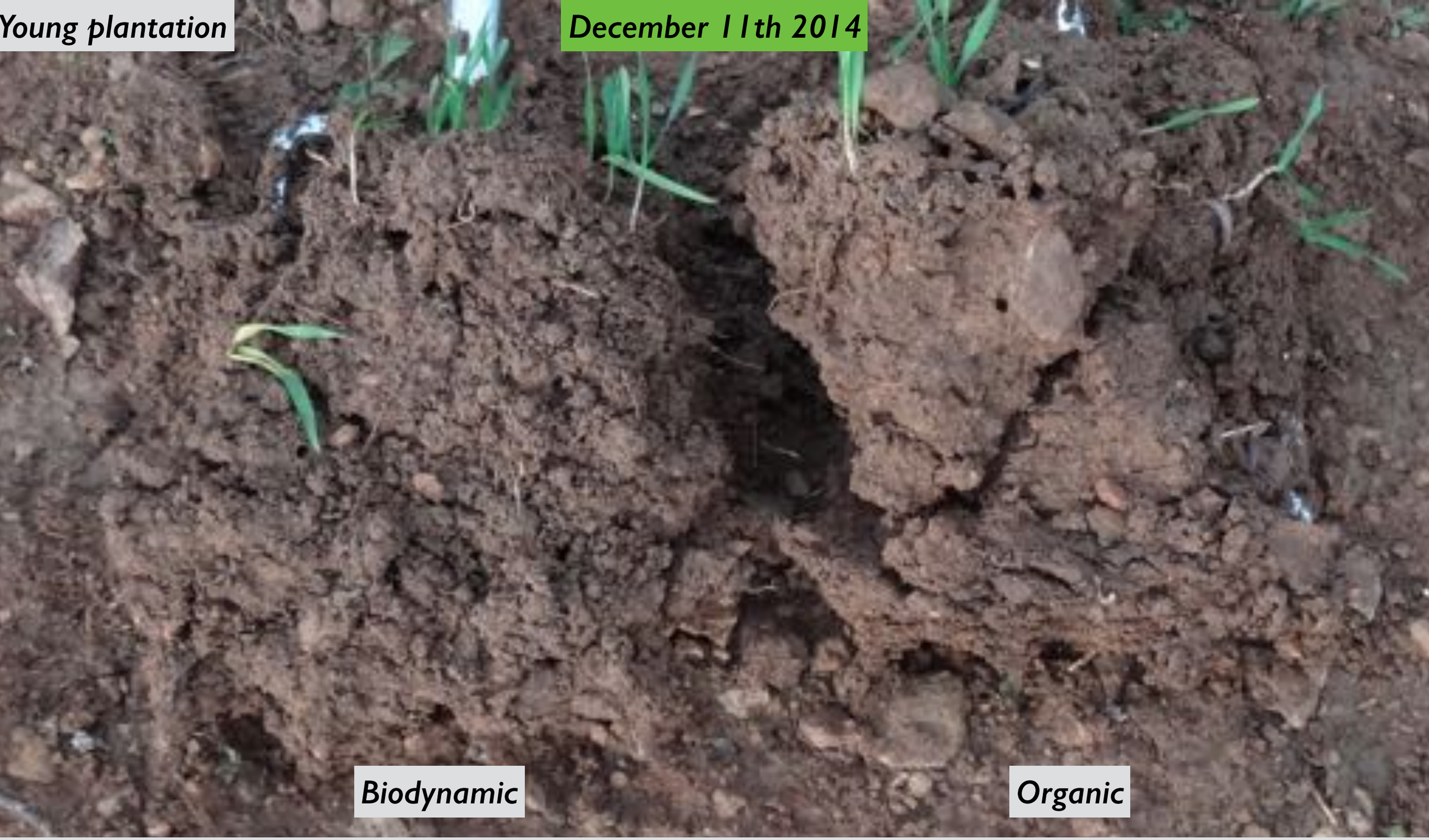
Only on the biodynamic side the plants still have their leaves, pernospora (mildiou) was only present on the organic side.

December 11th 2014 *Taking soil samples for analyses and chromas*

Organic

Biodynamic : stronger and darker green

Rye sown as green manure between the rows



After a very rainy season, the water is well managed in the BD soil. It sticks less to the fingers than on the organic side. We could also observe during the drying of samples that the BD soil at first looking more dry was longer to lose his water. This shows a better capacity for : water retention, erosion limitation, drought management.

December 11th 2014

Biodynamic

Organic

Darker color (humic) and crumbly structure on the biodynamic sample.
It is dried on the fingers, humidity is better managed.

Young plantation
Soil chromas December 2014

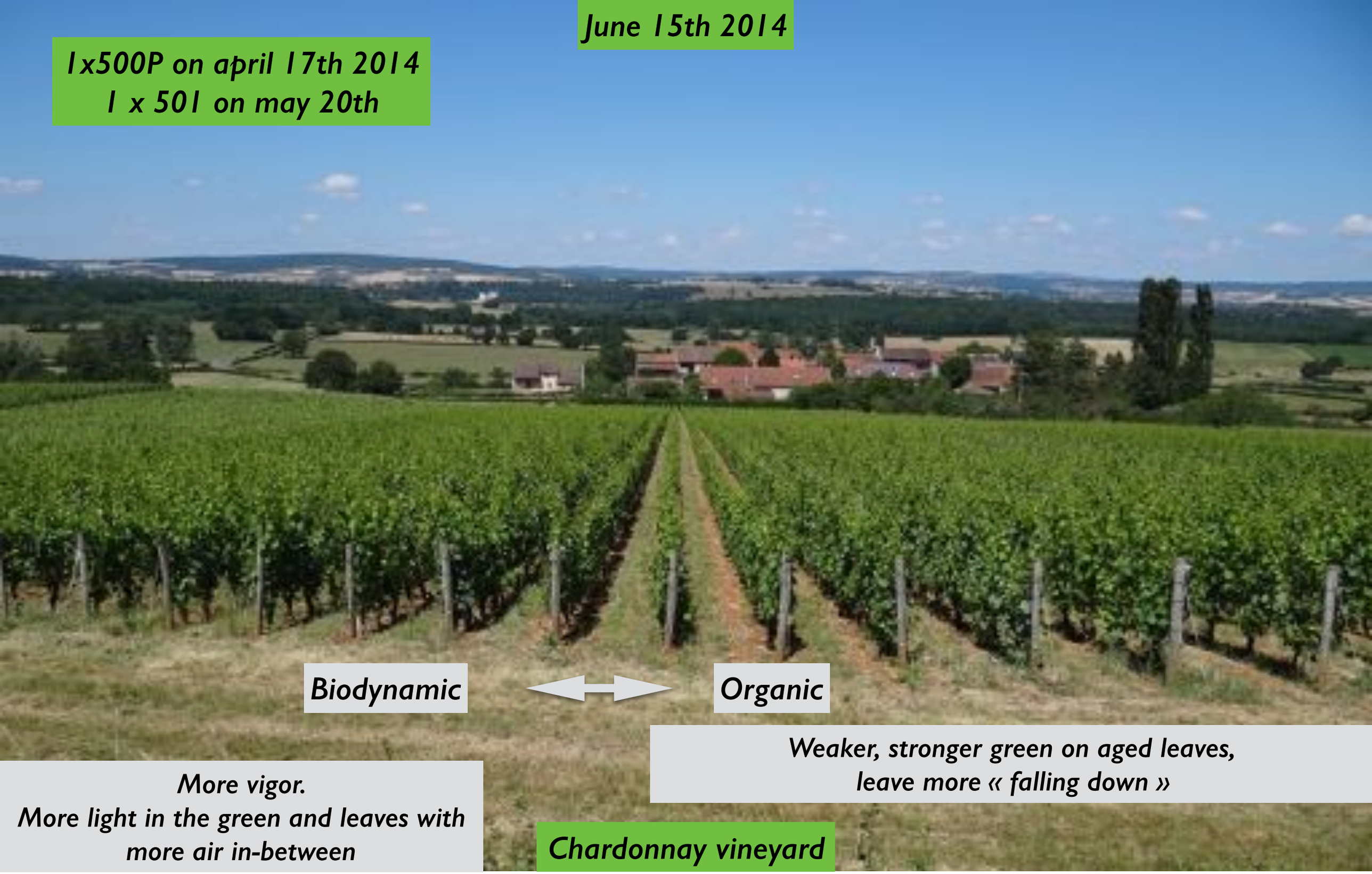
Biodynamic

Organic

Chromas Soin de la Terre

1x500P on april 17th 2014
1 x 501 on may 20th

June 15th 2014



Biodynamic ⟷ *Organic*

More vigor.
More light in the green and leaves with more air in-between

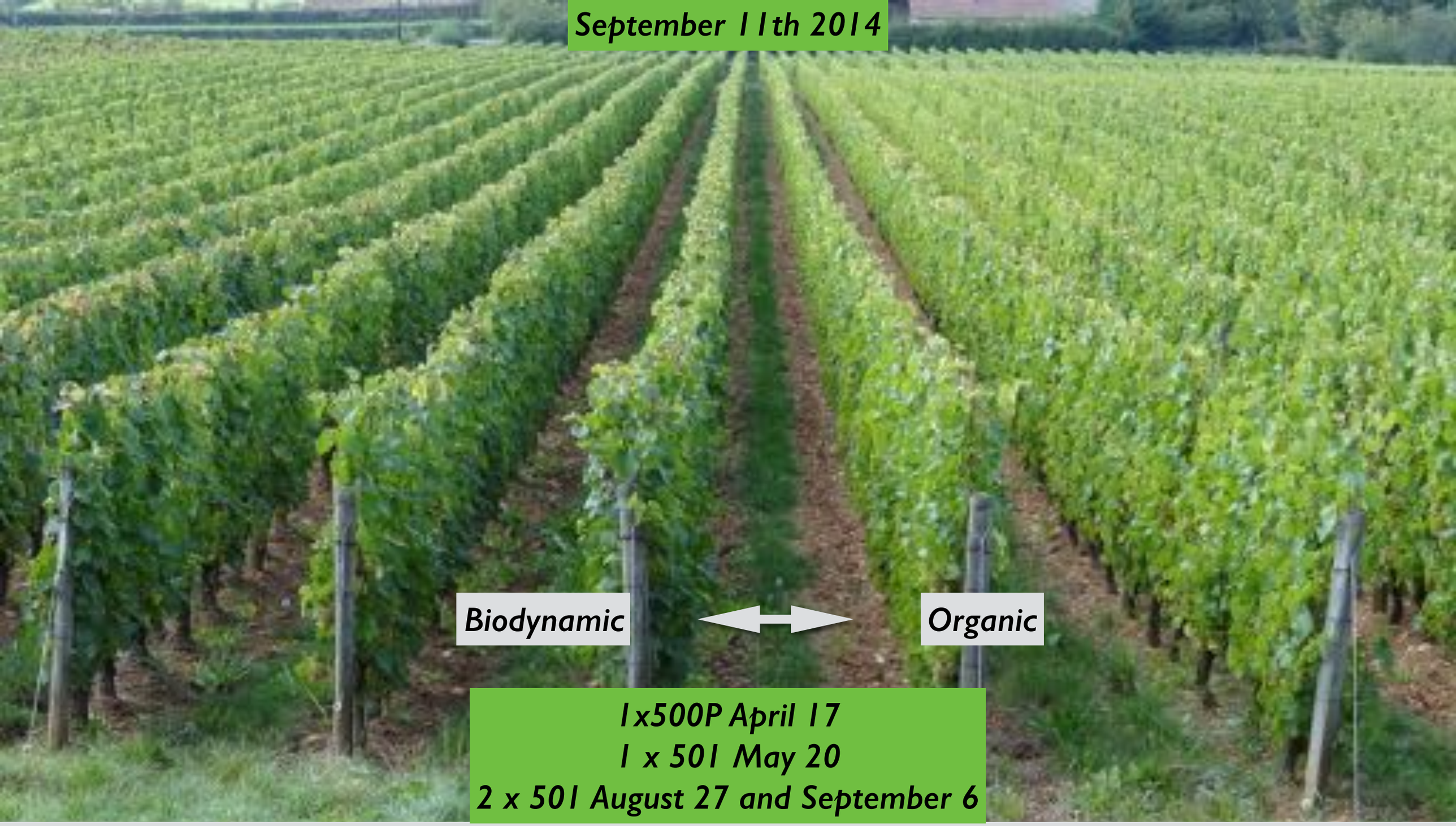
Weaker, stronger green on aged leaves, leave more « falling down »

Chardonnay vineyard


June 15th 2014
Biodynamic
The row looks wider due to more upright leave position

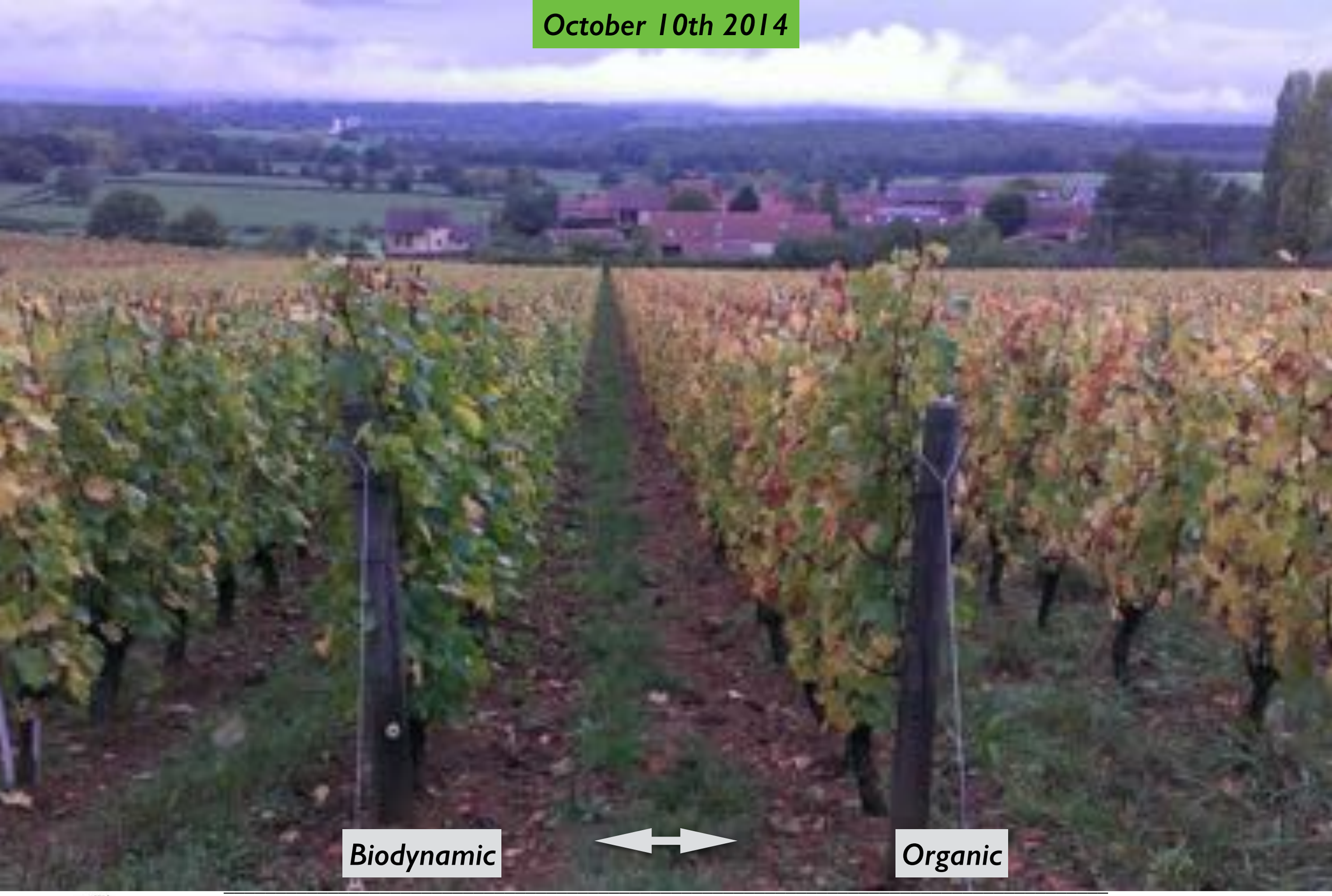

June 15th 2014
Organic
The rows look narrow, less growth


June 15th 2014
Biodynamic
Organic



A few days before harvest : on the organic part, leaves already turning to yellow, soil more pale.Dans la On the BD part, leaves more green, fruit maturity is the same as the organic side, but with a better pH, and a better balance of acidities, better available nitrogen level

Comparative tastings show a big difference in favor of the biodynamic part.


October 10th 2014
Biodynamic
Organic

October 10th 2014

Biodynamic

Organic

Difference in soil color and in wood quality. (wood is easier to prune on biodynamic side, the winegrowers say it looks like the plant has suffered less from spring drought).

Biodynamic : grass is stronger and more green

Organic : less grass

Chardonnay vineyard
Soil chromas December 2014

Biodynamic

Organic

Chromas Soin de la Terre

Young wines and Chardonnay plots : chemical and biological soil analyses

Analyses LCA

Boisseau experiment

Field	Color	OM %	total Nitrogen %	Water PH
BOISSEAU Young Wine Organic	Red	**3,41**	0,19	**8,10**
BOISSEAU Young Wine BD	Brown	**5,11**	0,28	**8,0**
BOISSEAU Chardonnay Organic	Red	**2,70**	0,17	**8,40**
BOISSEAU Chardonnay BD	Brown	**4,15**	0,22	**8,30**

Strong effects of 8 months of biodynamic practice :
Soil color changing from red to brown
Very high growth of the Organic Matter level : 1,45 to 1,7 % more, an average of 1.6%.

Young wines and Chardonnay plots : chemical and biological soil analyses

Analyses CELESTA LAB

Living compartment microbial biomass

Boisseau experiment

	Carbon (g/kg soil)	Microbial Biomass (MB)		Mineral elements stored in the MB (calculated in kg/ha)					CARBON			NITROGEN			
		mgC/ kg soil	en %C	N	P	K	Ca	Mg	C organique (g/kg TS)	C minéralisé (mg/kg/ 28j)	Indice de minéralisation (%)	N total (g/kg)	N minéralisé (mg/kg/ 28j)	Indice de minéralisation (%)	annual N supply possible (U)
BOISSEAU Young Wine Organic	19,8	326	1,6	86	66	56	8	8	19,8	339,4	1,7	1,7	18,7	1,1	49,1
BOISSEAU Young Wine BD	29,7	600	2	158	122	103	15	15	29,7	493,1	1,7	2,7	32,1	1,2	72,2
BOISSEAU Chardonnay Organic	15,7	338	2,2	89	69	58	8	8	15,7	338,1	2,5	1,7	19,2	1,2	50,4
BOISSEAU Chardonnay BD	24,1	570	2,4	150	116	98	14	14	24,1	631,9	2,6	2	30,6	1,5	80,3

The minerals N, P, K, Ca, Mg, needed for plant nutrition are much more available on the biodynamic parts.
It is quite doubled on both fields
Obvious greatest vigor on the biodynamic side is explained by the annual nitrogen supply possible.

This example shows how a vineyard was able to increase the organic matter in the soil on the experimental plots by 1,6% on average in less than a year of biodynamic practice. This represents an increase of roughly 50% within 8 months.

In this experiment, the soil density is 1,2. As shown by the fork tests, the evolution seems to be not only in the top soil, but also in depth. If we take an average of 1,6 point of OM on 50cm deep, 96 tons of Organic Matter is stored, i.e. 56 tons of carbon. Almost 205 tonnes of CO2 have been fixed per hectare.

Another experiment conducted the same year in the south of France (hot and very dry climate) showed the same type of results. In this second test, measurements taken at depth (70-80 cm) show an evolution of 0.32 OM point.
The fixed CO2 appreciation could therefore be made to a depth greater than 50cm …

This offers us interesting perspectives on the capacity of biodynamic practices to contribute to CO2 storage in soils, useful in action to limit global warming.

Those results led to partnerships with different scientific institutions in France (INRA National Agronomic Research Institute), Germany (Kassel University) and Switzerland (HES - HEPIA) to carry on with new experiments.

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Thank you for your attention !

This work was carried out jointly under the direction of Pierre and Vincent Masson

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