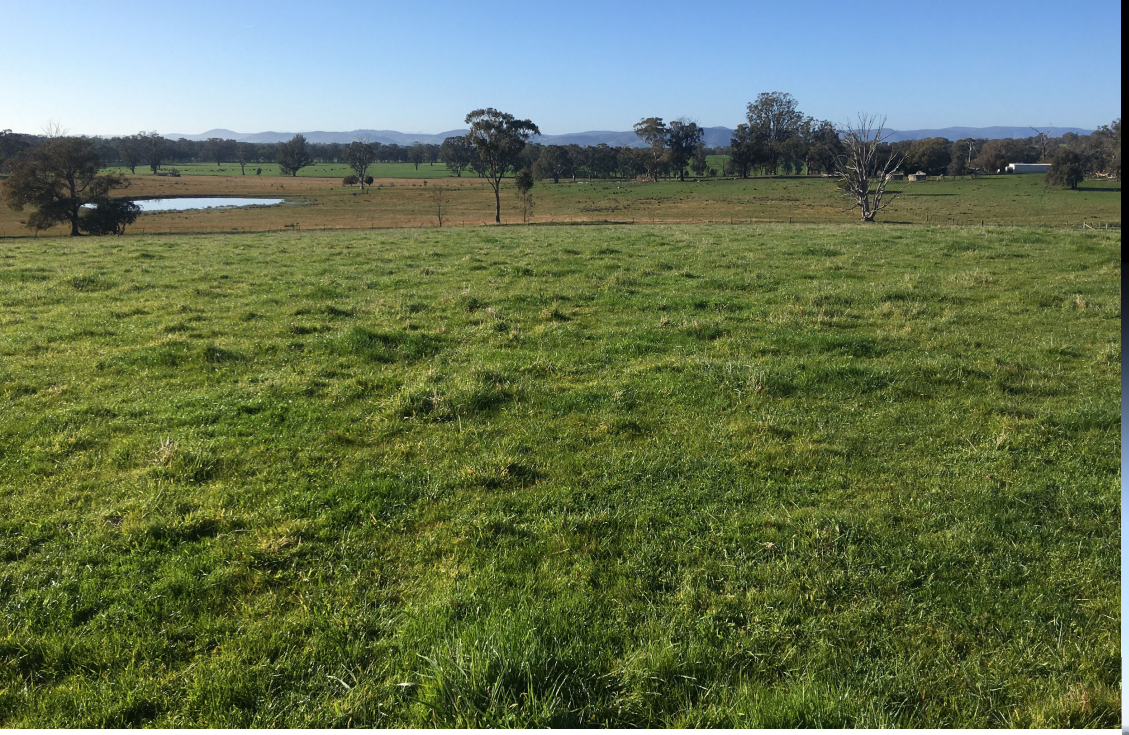


Conclusion

As can be seen in Table II the treatments used by Ian have resulted in improving the more important elemental ratios and lifting those elements that drive increased production and profit.

Two of the measured units which give a direct indication of soil health and productivity are the Ca:Mg ratio and Organic Carbon; both of these have had major improvement. Organic Carbon is highly correlated to Nitrogen availability and vital for fertility and soil biology. The toxic elements of Aluminium and Sodium have both been reduced and fertility has been increased.

The Cation Exchange Capacity (CEC) measures the ability of the soil to hold nutrient which is an indicator of the improvement in soil texture and improved fertility. In the Wiggins pasture, this has increased by nearly 30% between 2009 and 2019.

The dramatic percentage improvements noted in Table III would indicate the success of the nutrient program Ian has adopted. Ian's visual analysis of his pastures also supports these findings.

We gratefully acknowledge his keen support, willingness to experiment and for allowing us to diseminate this information.

References

Foletta I. 2019 unpublished

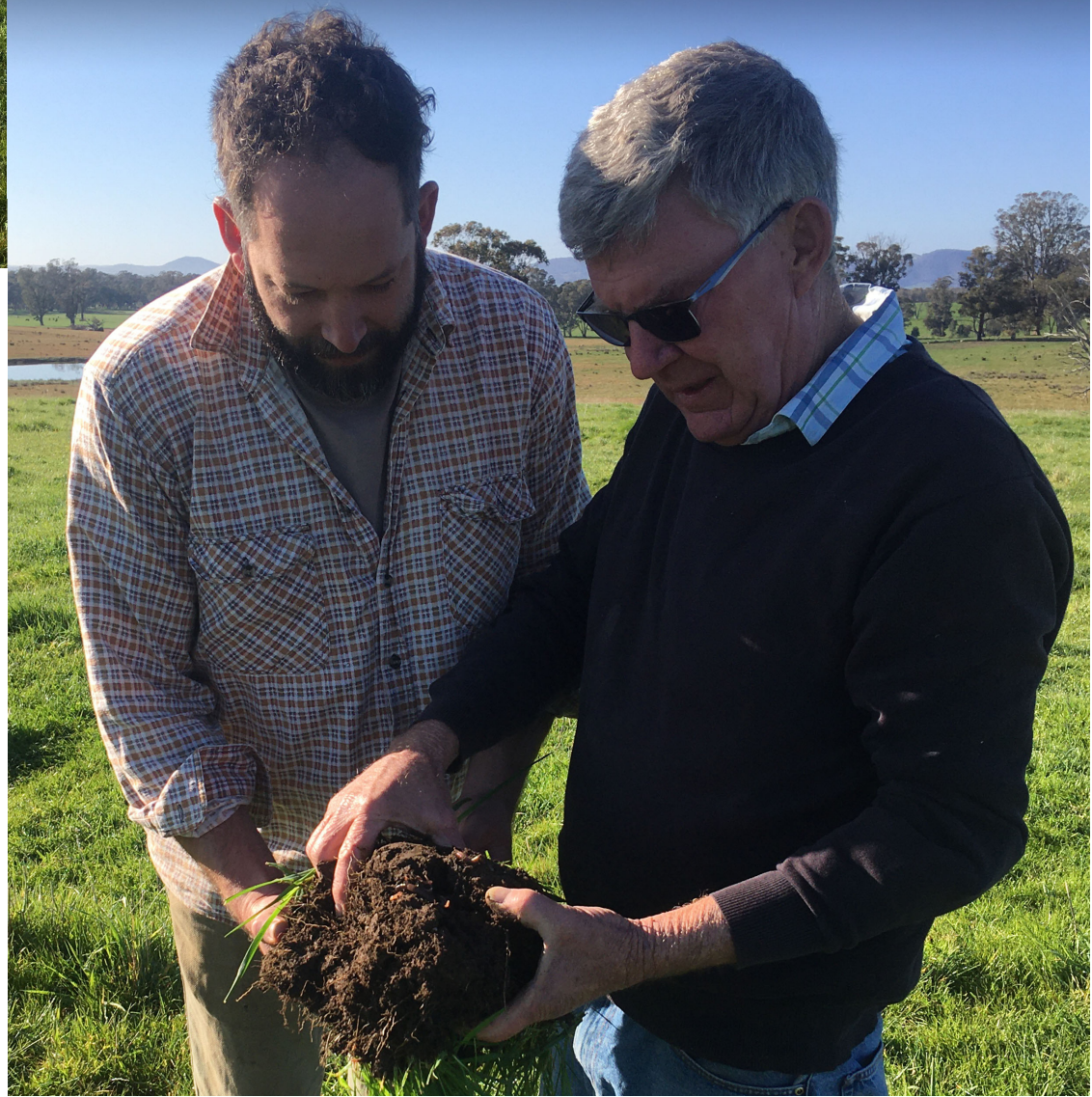
Hazelton P. and Murphy B. (2007) "Interpreting Soil Test Results – *What do all the numbers mean.* 2nd edition CSIRO publishing Melbourne

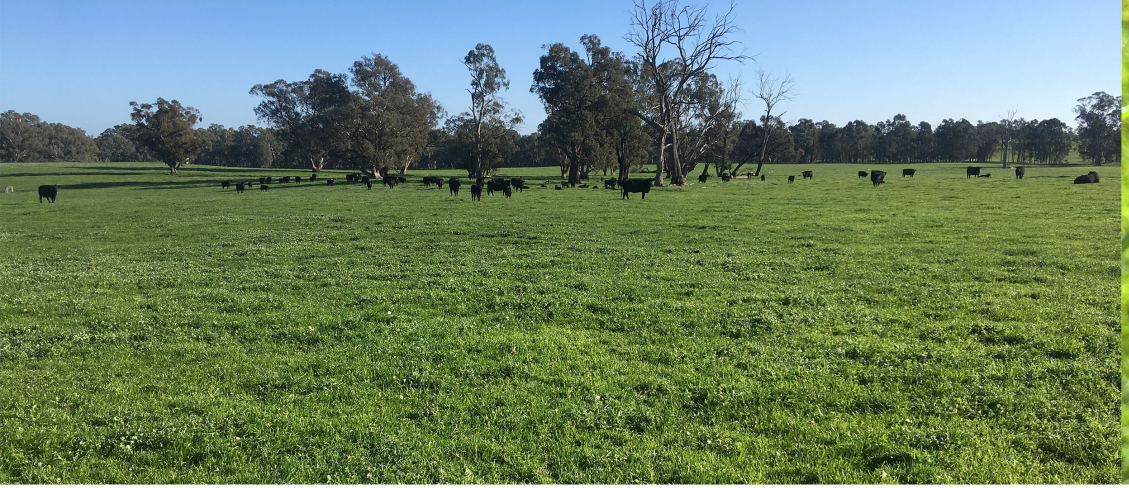
Appendix I.

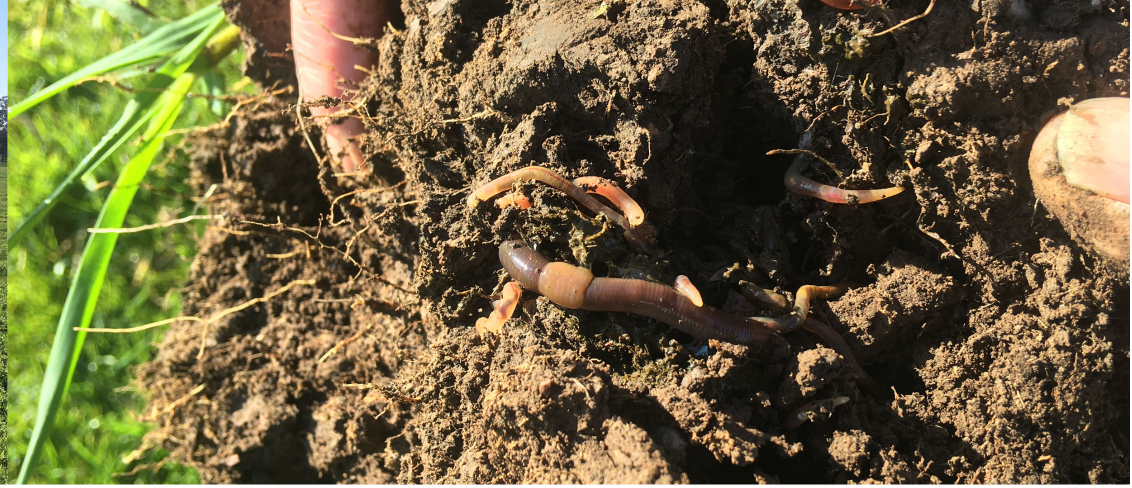
Soil Reports for 2009 and 2019

Hybrid-Ag

Case Study: Ian Foletta
Taking pasture to the next level







Taking Pasture to the next level with Hybrid-Ag

Evaluation of Ian Foletta's Wiggin's Paddock trial using Hybrid-Ag pasture blends

In 2009 Ian Foletta began a program to improve his pasture using a dry blend of soil conditioners and fertiliser prepared by Hybrid-Ag for use on his highly acidic soils at his property "Yin Barun" south of Benalla, Victoria. The property is in undulating country along the banks of the Broken River, and the data presented in this report comes from his Wiggins Paddock.

Ian had begun a program of soil improvement many years earlier using lime top dressed on his pasture paddocks. After a meeting with Judah Rowe from Hybrid-Ag and conducting a soil test, Ian and Judah began to develop dry blends that were able to enhance the soils at a reasonable cost.

This large-scale experiment was conducted over 10 years. This case study analyses data from 2009 against data from 2019, after 10 years of Hybrid-Ag dry blend applications.

Table II. Nutrient analysis 2009 compared to 2019 in Wiggins

Element	Units	2009	2019	% Increase
Phosphorus Colwell	Mg/Kg	25	44	76
Potassium Colwell	Mg/Kg	118	176	49
Sulfur	Mg/Kg	10	19.5	95
Magnesium	Mg/Kg	142	198	39
Sodium	Mg/Kg	53	44	-17
Calcium	Mg/Kg	1042	1470	41
Aluminium	Mg/Kg	23	10	-57
Boron	Mg/Kg	0.3	0.77	156
Iron	Mg/Kg	107.9	324	200
Manganese	Mg/Kg	11.65	7.28	-37
Copper	Mg/Kg	0.79	1.37	73
Zinc	Mg/Kg	2.99	1.62	-45
Soil Organic Carbon	%	2.7	4.2	56
Calcium/Magnesium Ratio		4.42 : 1	4.45 : 1	1
CEC	Meq/100g	7.62	9.75	28
TEC	Meq/100g	10.37	13.32	28
pH (H2O)		5.7	5.8	2

Table II shows the elements of both tests that could be compared in the same units. Nitrogen has been omitted as it fluctuates wildly. Both tests have been taken in spring so the time frame is similar.

Soil Ratios

Soil ratios give an indication of the fertility balance in the soil. When the soil is balanced all elements are available for plant growth. (Hazelton P. And Murphy B. 2007) Table III presents these ratios listed in order of importance with Calcium/Magnesium ratio being the most important and Iron/Manganese the least. Note that the calcium : magnesium ratio and the magnesium : potassium ratio are both approaching their ideal after the ten applications of the dry blends by Hybrid-Ag.

Table III. Ideal elemental ratios versus ratios in Wiggins

Nutrient Ratios	Ideal Values (mg/kg)	2009 Wiggins Ratios	2019 Wiggins Ratios
Ca : Mg	5:1	4.42:1	4.45:1
K : Mg	1:1	0.83:1	0.89:1
S : P	1:1	0.40:1	0.44:1
P : Zn	10:1	8.33:1	27:1
K : Na	4:1	2.23:1	4:1
Fe : Mn	2:1	9.31:1	44:1

These ratios are guidelines, however they would indicate the addition of calcium, potassium, sulfur and manganese would assist in developing the fertility of the Wiggins pasture production.

The use of soil ammending fertilisers must of course be modified with the intended production. When adding nutrients it is important not to add so much of one nutrient that it causes an imbalance and impacts the level of production. In this case it was modified to suit pasture at the appropriate expense ratio of production levels.

A standard pasture production value of 6t/ha of fodder produced during the winter/spring season using a ryegrass/sub clover pasture valued at $200/t for the fodder, equates to a return of $1200/ha.

A Hybrid-Ag conditioning and fertilising blend costs around $220/ha (including spreading) and gives a return of $5.00 for each dollar spent on fertiliser and represents excellent value. These blends not only provide a base for better pasture but they increase the value of the land, in this instance by 28%.

These blends and the standard lime treatment of 2.5T/ha every fifth year have changed the composition of Ian's pasture to reduce weeds such as capeweed and silver grass. They have also reduced insect pressure all without chemical sprays.