

THE MIKHAIL SYSTEM

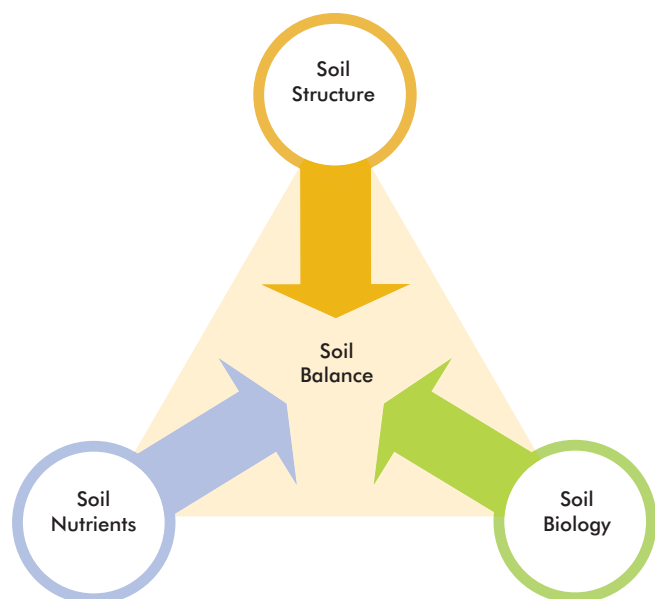
This fact sheet introduces The Mikhail System – a system of fundamental principles that make up SWEP’s Complete Soil Balance Analysis.

The Mikhail System is the defining factor that separates SWEP’s soil test results from other laboratories. To be able to take full advantage of the research that SWEP founder and Managing Director, Mr Ted Mikhail, has been refining for almost 50 years, the **Complete Soil Balance Analysis** provide SWEP clients with the status and requirements of soil structure, nutrients and biology. All three components are analysed under the same roof, with a guaranteed turnaround time of 10 working days for the complete set of results.

By undertaking a Complete Soil Balance Analysis, The Mikhail System allows each component of soil to be analysed according to its individual characteristics. The underlying concept here is soil balance. Balancing a soil is what we are actually striving to achieve when we talk about soil health. A “healthy” soil is difficult to define – a balanced soil is an achievable, measureable goal that The Mikhail System can help you to accomplish.

How does The Mikhail System work?

The Mikhail System draws similarities between the human body and soil as being a living system. Just as the human body has specific requirements for proper skeletal, digestive and immunity function, the soil has specific requirements for structural, nutrient and biological function. These differ slightly according to individual requirements, both in humans, and also soil.



A Complete Soil Balance Analysis provides the current status of a soil’s structure, nutrients and biology. Additionally, it provides the specific requirements to achieve that soil’s optimum potential, that is, what it needs for all three components to function at its best. Finally, along with individual soil component requirements, the report explains how this should be executed so as to have all three components in balance with each other. The results of every test are tailored to specific land use options, so that a comparison can be made to assist the client in deciding how best to utilise their property.

Structural balance

Soil structure is affected by the relative proportions of exchangeable calcium, magnesium, sodium, potassium and hydrogen cations present in that soil. The significant difference with SWEP analyses is that the exchangeable hydrogen is measured, rather than estimated from the pH.

Besides soil water, there are other forms of exchangeable hydrogen in the soil. Exchangeable hydrogen is also found in soil colloids (humus and clay), however these operate differently (for example, humus is far more complex than clay). Research carried out by Ted Mikhail has shown that some of the exchangeable hydrogen in organic matter is required as an intrinsic part of its make up, so this part of the exchangeable hydrogen does not take part in the soil balance. Therefore, to measure the exchangeable hydrogen correctly, it must be adjusted according to each particular soil and total organic matter.

The following tables demonstrate how adjusting the exchangeable hydrogen according to the percentage of Organic Matter (OM%) of each soil affects the Cation Exchange Capacity (CEC).

In this first table, two very different soils appear to have a similar CEC, even though there is a significant difference between their OM% and exchangeable hydrogen.

	PH	OM%	Exchangeable H	CEC
Loamy fine sand	5.2	16.2	13.8	25.6
Heavy clay	6.6	4.4	8.3	25.4

The second table shows the same soils, this time with correctly adjusted exchangeable hydrogen relative to their OM%, and consequently, correctly adjusted CEC’s.

	PH	OM%	Adjusted Exchangeable H	Adjusted CEC
Loamy fine sand	5.2	16.2	5.7	17.5
Heavy clay	6.6	4.4	6.1	23.2

In order to balance soil structure, it is necessary to balance the exchangeable cations so that they are in desirable relative proportions. To achieve this, the figures must be accurate to begin with. **The adjusted CEC that appears on all SWEP soil test results shows the correctly adjusted, measured exchangeable soil cation proportions. This allows for both soil variability and the importance of organic matter to soil function. To our knowledge, currently only SWEP has the research, experience and technical capability to provide correctly adjusted, measured exchangeable soil hydrogen and thus exchangeable cation proportions.**

Balancing soil nutrients

The key concepts here are balance, soil and nutrients. SWEP soil analyses are performed according to specific information provided on the sample submission form from the client or their agent. To correctly balance soil nutrients, many variables must be addressed, as the analysis relies on the recorded soil depth, land use (crop or plant type), rainfall and/or irrigation details and target yield for each soil. Recommendations for nutrients (fertiliser and trace element requirements) are provided according to this information and relate to soil application for the growing season. That is, the soil requirements to enable it to function:

- At its optimum,
- Whilst supporting that particular crop,
- Aiming for that target yield and
- Assuming the specified amount of rainfall or irrigation allocation will be applied.

Therefore, if a particular land use is specified where the soil is greatly deficient in a particular nutrient essential to that plant for growth, the considerations must be:

- How long will it take to build up the soil for this particular nutrient to support this crop/ land use?
- Should I choose a less demanding/more suitable crop or land use in the meantime for this particular soil?
- Is it financially and logistically possible to supply these nutrients to the soil so as the crops will benefit immediately? E.g., will the application of certain nutrients do more harm than good (due to sheer quantity, nutrient lock up, risk of crop burn etc.) if I apply them all now?
- Should I perform a plant tissue test to determine what I can apply as foliar treatments to my current crop whilst I tackle building up the soil over a longer period?

SWEP provide up to three different land use options per sample at no extra cost, so you can compare crop types or target yields to assist you with your decisions. Extra land use options beyond three are also available at \$11.00 each (inc. GST).

Soil biological balance

For a soil to perform at its optimum, balancing the biology is as important as balancing soil structure and nutrients. Simply having “biological activity” present is not necessarily an indication of a balanced or “healthy” soil. Consider the human digestive system for example. We have certain numbers of many different bacteria that allow us to function normally when they are in relative, balanced proportions. However, an overgrowth of a bacterial population can rapidly cause an upset digestive system. This example of high biological activity is certainly not healthy.

SWEP look for key indicator biological groups within soil, then determine their relative numbers and compare this to desirable indicator group ratios. The key indicator groups SWEP look for are:

- Actinomycetes,
- Yeasts,
- Photosynthetic bacteria,
- Fungi,
- Cellulose utilisers and
- Lactic acid bacteria.

This becomes especially important when choosing bioactive products to apply to the soil – products claiming they are “proven biological stimulants” are not necessarily beneficial to all soils, as different products encourage and/or suppress certain indicator groups. If a soil had high levels of a certain indicator group initially and a product known to encourage that particular group was applied, a further imbalance within the soil biological population could result. SWEP can determine which biological groups are present in a soil, their ratios and beneficial products to use to bring the total active biological population into balance.

The Mikhail System - Complete Soil Balance

A SWEP Complete Soil Balance Analysis not only provides the information to balance each component of soil, but also to create balance between these three components. Instructions and ongoing support are available to assist clients balancing their soil so that it can be undertaken in the right order, using the right ingredients with the right advice. SWEP are committed to educating growers about The Mikhail System - not product sales - so that everyone can experience optimum productivity from knowledge.

For further information please visit our website: www.swep.com.au or call us on 03 9701 6007.