

BCG puts Alkaline and Acid test on soil labs

BCG

Introduction

In response to some quite negative rural press late last year on the accuracy of soil testing laboratories, the BCG decided to carry out its own survey. Two soil samples (one alkaline and the other acid) were independently supplied by the Department of Primary Industries.

The most commonly used laboratories were informed, prior to analysis, that the results would be used in publicity. All labs were most co-operative and also supplied their most recent 2003 Australian Soil and Plant Analysis Council (ASPAC) proficiency test results (See Table 2).

ASPAC Proficiency Test Results

All results provided are included in Table 2 so that the total situation of what proficiency tests are met by the various laboratories can be viewed. Many of these tests are of limited interest to grain growers and the numbering system (i.e. 3A1 Electrical Conductivity) is an ASPAC national coding system for soil data (1992).

Table 1 Cost of Analysis is self explanatory and highlights the huge variability between laboratories (\$68.20 compared with \$341.00). When soil samples were sent to each laboratory a basic soil test for cropping was asked for. No laboratory enquired as to what we were actually requiring; of course boron and aluminium were specifically requested. The range of analysis we received was large but have been mostly reported in Tables 3 and 4, with blanks indicating a nil report. Farm Right utilises the CSBP laboratory for its analysis so it is interesting to note how the same sample is reported by these two services.

Note: State Chemistry Laboratory (S.C. Lab) trading as Soilutions is the Department of Primary Industries Soil Analysis Laboratory.

Accuracy of Results

Soil analysis results across the 5 laboratories utilised were consistent. This gives us confidence that if we use any of these labs the slight variation in results achieved will not be an issue. The exceptions to this statement are highlighted by * in Tables 3 and 4.

Soil Phosphorous "Colwell"

It is a disappointment that CSBP is the only lab out of the four that presents a cropping soil analysis for phosphorous as a Colwell reading. Colwell is the desired standard within Australia for giving soil phosphorous results. It is no wonder that there is sometimes confusion by end users of the data. This is an issue that must be taken up by ASPAC who at present do not regulate or advise the market place presentation of soil results.

Cost and Turn around Time

All labs had their results back to us within a two-week period, which is highly desirable. We have had numerous comments over the years of extremely long turn around times experienced – this test has highlighted that it can be done within an acceptable time.

Contact details for the Laboratories used are:

CSBP Future Farm Soil and Plant Nutrition Laboratory

2 Altona St Bibra Lake WA 6163
Ph 08 9434 4600 Fax 08 9434 4611
Attention Dr Geoff Proudfoot

Farmright Technical Services

Unit 7/1 Crichton Road
Kyabram Vic 3620
Ph 03 5853 2484 Fax 03 5853 2485
Attention Don Cook

SWEP Analytical Laboratories

PO Box 590 Noble Park Vic 3174
Ph 03 9701 6007 Fax 03 9701 5712
Attention Melinda Hunter

Incitec Pivot

Cnr South Road and Wilson Ave
Werribee Vic 3030
Ph 9974 4100 Fax 9974 0699
Attention Hugh Mawhinney

State Chemistry Laboratory

Primary Industries Research – Victoria
Werribee Centre
621 Sneydes Road Werribee Vic 3030
Attention George Croatto

Table 1. Laboratory Soil Testing Prices (GST inclusive) (This price is for the analysis of 2 Basic soil tests plus boron and aluminium)

C.S.B.P	\$68.20
S.C. Lab	\$341.00
Farm Right	\$125.40
Incitec – Pivot	\$83.03
SWEP	\$242.00

Table 2. The following laboratories meet ASPAC's proficiency test criteria for the following methods conducted in the 2003 Soil Proficiency Testing Program:

Test	S.C.Lab	SWEP	IncitecPivot	CSBP/FarmRight
3A1 Electrical Conductivity	✓	✓	✓	--
4A1pH	✓	✓	✓	✓
4B1, 4B2 pH	✓	--	✓	✓
5A1 Soluble Chloride	✓	--	--	--
5A2 Soluble Chloride	--	--	✓	✓
Pooled Total Organic Carbon	✓	--	--	--
6A1 Organic Carbon	✓	--	✓	✓
6B1 Total Organic Carbon	--	✓	--	--
Dumas Total Nitrogen	✓	--	--	✓
7C2 Nitrate Nitrogen	✓	--	✓	✓
7C2 Ammonium Nitrogen	✓	--	--	✓
Pooled Total Phosphorus	--	✓	✓	✓
9B1, 9B2 Extractable Phosphorus	✓	--	✓	✓
9C1, 9C2 Extractable Phosphorus	✓	✓	✓	✓
9E1, 9E2 Extractable Phosphorus	✓	--	✓	--
Colwell Pooled Phosphorus Buffer	✓	--	--	✓
Olsen Pooled Phosphorus Buffer	✓	--	--	--
KCL40 Extractable Sulphur	✓	--	✓	✓
12C1 Extractable Boron	--	--	--	✓
12C2 Extractable Boron	✓	✓	✓	--
12A1 Extractable Copper	✓	--	✓	✓
12A1 Extractable Iron	✓	--	✓	✓
12A1 Extractable Manganese	✓	✓	✓	✓
12A1 Extractable Zinc	✓	✓	✓	✓
15A1 Exchangeable Calcium	--	--	✓	✓
15D3 Exchangeable Calcium	✓	--	✓	--
15A1 Exchangeable Magnesium	--	--	✓	✓
15D3 Exchangeable Magnesium	✓	✓	✓	--
15A1 Exchangeable Sodium	--	--	✓	✓
15D3 Exchangeable Sodium	✓	--	✓	--
15A1 Exchangeable Potassium	--	--	✓	✓
15D3 Exchangeable Potassium	✓	--	✓	--
15G1 Exchangeable Aluminium	✓	--	✓	✓

Table 3 – North East Soil Analysis Results (acid soil)

Texture	S.C Lab	CSBP	Farm Right	IncitecPivot	SWEP
pH water	5.5	5.3	5.3	5.1	5.1
pH CaCl ₂	4.9	4.6	4.6	4.8	4.5
Organic Carbon %	1.6	1.52	1.5	1.2	1.5
Phosphorus Olsen mg/kg	22	27.1	26.2	21.5	32.7
Phosphorus Colwell mg/kg		64	63		
Potassium mg/kg	220	254	275	226	238
Sulphur mg/kg	37	25.5	23.6	40	13 *
Calcium mg/100g	4.8	5.9	5.8	4.6	
Magnesium mg/100g	0.64	0.73	0.77	0.84	
Sodium mg/100g		0.06	0.07	0.07	
EC 1:5 water ds/m	0.12	0.07	0.07	0.09	0.09
Nitrate Nitrogen mg/kg		10	9	14.1	11.3
Ammonia Nitrate mg/kg		4	5		
Nitrogen (total) % w/w	0.12				
Aluminium mg/kg	10	20	28	28	7.8

Table 4 – Mallee Soil Analysis Results (alkaline soil)

	S.C. Lab	CSBP	Farm Right	IncitecPivot	SWEP
pH 1:5 water	9.7	9.4	9.4	9.4	9.4
pH 1:5 CaCl ₂	8.6	8.4	8.3	8.5	9.0
Organic Carbon %	2.7*	0.53	0.50	0.30	0.40
Phosphorous Olsen mg/kg	6	7.2	7.0	5.2	9.3
Phosphorous Colwell mg/kg		16	16		
Potassium mg/kg	350	379	396	355	374
Sulphur mg/kg	24	23.2	21.2	24	7*
Boron mg/kg	7.7	7.8	7.9	9.3	5.4
Calcium mg/100g	19	10.6	10.4	22	
Magnesium mg/100g	3.5	3.0	3.0	4	
Sodium mg/100g		2.2	2.1	2	
EC 1:5 water ds/m	0.29	0.29	0.31	0.26	0.31
Nitrate Nitrogen mg/kg	-	4	3	3.7	7.3
Ammonium Nitrate mg/kg	-	4	4	-	-