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ASPAC PLANT PROFICIENCY TESTING PROGRAM REPORT

2011-12

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Foreword

This annual report is the seventh in the upgraded inter-laboratory proficiency program (ILPP) for plant chemical tests, the first of which occurred in 2004-2005 report. It covers three "rounds" each of four specially prepared samples sent to around 38 participants in October 2011, in February 2012 and in April 2012. A similar annual program for soils (reported separately) operated over much the same time period.

Members of ASPAC's LPC, the membership of which is listed on page iv of this report, oversaw the program. The ASPAC Executive is grateful to all of those who contributed to the report, inclusive of staff of Global Proficiency Ltd, our service provider in New Zealand.

The ASPAC-LPC and the ASPAC Executive Committee also appreciates the effort made by laboratories who utilized the method-specific proficiency program. By participating, they share a commitment to and responsibility for measurement quality, noting that measurement proficiency is only a component of laboratory accreditation to ISO-IEC 17025 standard, which should be an achievement goal for laboratory managers.

Dr Roger Hill
ASPAC-LPC Convenor

Acknowledgements

Mr Lyndon Palmer (South Australia) is thanked for helping to identify and quantify random Co, Cu and occasionally Fe contamination in circulated plant samples. We also thank Mr Alan Jeffrey (Queensland) and staff at Hill Laboratories (New Zealand) for their analytical efforts to help discover occasional plant sample contamination during preparative stages. Those commissioned by GPL to confirm that test plant samples were homogenous prior to circulation for proficiency testing purposes (e.g., LandCare Research, New Zealand) are also acknowledged, as are operational staff of GPL.

Membership of ASPAC Laboratory Proficiency Committee 2015

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[†] Mr B.K. Daly of Palmerston North, NZ, who retired from the ASPAC-LPC on 10 June 2013, was a member of the ASPAC-LPC when this program occurred.

Service Provider Details 2015

Name, Street and Postal Address	***Key Personnel & Current Emails.***
Global Proficiency Ltd (GPL) [A].	*Business Manager:* Gordana.Aleksic@global-proficiency.com
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[A] ***Note:*** GPL, under its "PlantChek" logo, is accredited by IANZ (the New Zealand accreditation authority) to ISO/IEC 17043:2010 standard, noting that IANZ is a full member of both the International Laboratory Accreditation Cooperation (ILAC), and Asia Pacific Laboratory Accreditation Cooperation (APLAC). GPL is also recognised by NATA (National Association of Testing Authorities of Australia) as a proficiency provider.

Contents

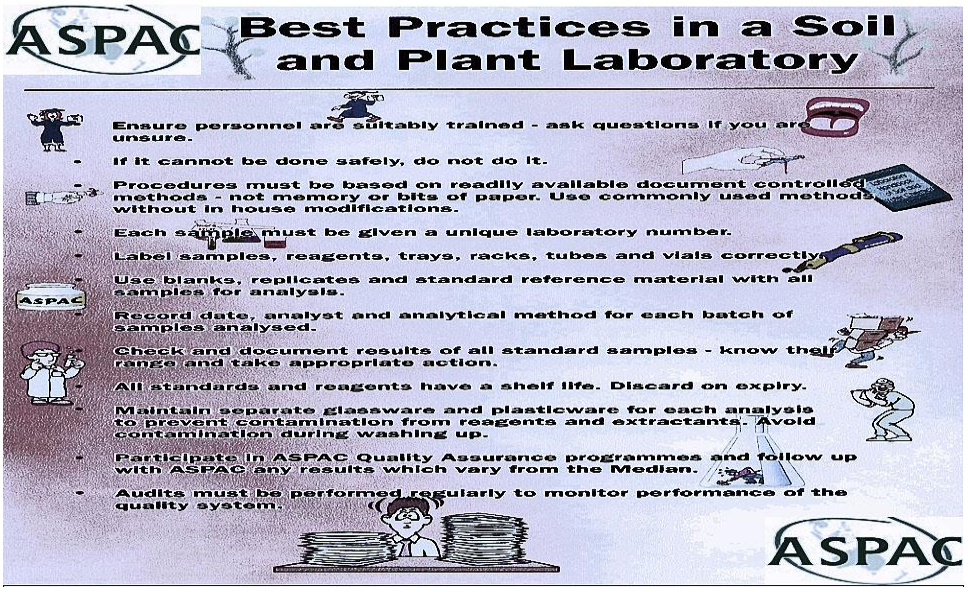
Notes on ASPAC Method-specific Certification: *what it is and what it is not*

In common with almost all soil, plant and water ILPPs worldwide, this plant ILPP used a selection of carefully prepared samples to allow participating laboratories to test and compare their method-by-method measurement performance relative to those of their peers across Australasia. The process is method-specific, as each method (or elemental test) is assessed separately using internationally-respected non-parametric statistics. Obviously, the peer review process is strongest for methods/tests with most participants, always ≥6 and typically well in excess of that number. Regular feedback with "round-by round" regularity provides tangible evidence to guide laboratory managers in their efforts towards measurement excellence.

Subsequently, a published numeric process was used on a method/test basis and on each of three "rounds" of four samples in the program year to determine whether or not a given laboratory qualified to be ASPAC Certified for that test. For the program year covered by this report, 21 was the maximum number of possible certifications per laboratory. The ASPAC Certifications achieved remained current until superseded by findings from the next corresponding ILPP.

Irrespective of method-measurement quality, it remains the responsibility of laboratory management to pay close attention to total quality management. This involves attention to performance in inter-laboratory proficiency programs while also taking account of variables such as technical competence and procedures, sample preparation, records of corrective actions, customer complaints, instrumental accuracy checks and maintenance, staff training / qualifications, standard-solution preparations, method validation / verification, internal audits, batch quality control, reports to clients, etc. Laboratory accreditation to ISO-IEC 17025 standard covers all of these. The National Association of Testing Authorities (NATA) is responsible for laboratory accreditation and compliance in Australia.

Field sampling, the transport of samples to the laboratory, and the interpretation of test results for clients are other areas that affect the final outcome of soil and plant chemical testing for diagnostic purposes. For helpful guidelines on these topics, refer to publications by Brown (1994)[1], Peverill *et al*. (1999)[2], Rayment (2006)[3] and Reuter and Robinson (1997)[4]. The following "poster", prepared by ASPAC, was designed for within-laboratory use.



[1] Brown, A.J. (1993). A review of soil sampling for chemical analysis. *Australian Journal of Experimental Agriculture* **33(8)**: 983-1006.

[2] Peverill, K.I., Sparrow, L.A. and Reuter, D.J. (Editors) (1999). "Soil Analysis: an interpretation manual". (18+369 pp.) CSIRO Publishing, Victoria.

[3] Rayment, G.E. (2006). Australian efforts to prevent the accidental movement of pests and diseases in soil and plant samples. *Communications in Soil Science and Plant Analysis* **37**: 2107-2117.

[4] Reuter, D.J. and Robinson, J.B. (Editors) (1997). "Plant Analysis: an interpretation manual". (12+572 pp.) CSIRO Publishing, Victoria.

1. Introduction

This not-for-profit, annual report for 2011-12 consolidates (for ASPAC members and for the public record) program methodology, summary statistics, and a full listing of results by test for three "rounds" of plant chemical testing. For historical details on earlier annual ILPP's for both plant and soil samples undertaken by ASPAC, refer to the ASPAC Web Site at http://www.aspac-australasia.com.

The report includes a description of how ASPAC confers performance-based, method-specific certification to laboratories that participated throughout the program year. To respect confidentiality, the cross-reference between laboratory name and laboratory identification number is not included. However, laboratories certified as proficient for specific tests included in this annual program were documented at the time on ASPAC's public web site mentioned above.

2. Program Details

2.1 Responsibilities

What is now GPL was contracted by ASPAC as the plant ILPP provider for 2011-12. Accordingly, GPL had responsibility on a "round-by round" basis for sourcing and preparing samples and for the timely supply of prepared samples to participating laboratories. They also undertook data collation and statistical analysis and "round-by-round" reporting for ASPAC. In addition, they assembled the contents of the summary and "raw" data tabulations provided in Section 3 and Appendix 4 of this report.

Members of ASPAC-LPC had responsibility to implement and resolve matters of policy and to provide guidance on technical matters specific to plant chemical testing both to GPL and to laboratory participants. The ASPAC-LPC also undertook statistical checks and other actions for quality control purposes, participated in a Technical Advisory Group operated jointly with GPL, and contributed to training workshops. Laboratory managers and staff of those who contributed to this annual program are encouraged to seek help from ASPAC if they are shown to be operating at levels of measurement performance below their peers. Appropriate contacts are members of the ASPAC-LPC and/or State representatives of ASPAC (or equivalent).

Participants receive a unique, confidential laboratory number, subsequently used to identify the origin of each result presented in program reports and listings of results. Typically, this identification number carries forward from one annual program to the next.

2.2 Plant program participation

Some 38 laboratories [28 from Australia, 2 from Fiji, 5 from New Zealand, 2 from Papua New Guinea, 1 (one) from Samoa] participated in the ASPAC plant ILPP in 2011-12, but numbers of reported results varied by "round" and plant test (see Table 1). The counts for each test element and sample are given in Table 1 and in Section 3. Contact details for laboratories that submitted results for any test in one or more of the three "rounds" are provided in Appendix 1.

2.3 Tests, units, laboratory participation and concentration ranges

Three proficiency "rounds" for plant materials – each comprising four samples – were offered in 2011-12. Participants were invited to analyse each sample using methods normally employed in their laboratory. Tests commonly performed are documented in Table 1, noting that participant numbers for each element and "round" are also listed. Laboratories were not required to submit results for every one of these tests, although a minimum

of six participating laboratories per "round" were required for any one test to permit meaningful statistical analyses. In addition, Table 1 includes concentration ranges (minimum, median, maximum) for each element across the 12 samples, noting that those concentration ranges derive from "final" populations after removal of "stragglers" and "outliers". Apart from four elements (C, Fe, Mg, Mn) the population average concentration for a given element was higher than corresponding medians (average values not presented). Moreover, 10 grand median concentrations were lower than their 2010-11 counterparts, 7 were much the same, and only 4 were higher, suggesting final robust %CVs might be slightly higher for this program year than occurred in 2010-11.

Table 1. Plant tests, elemental symbols, units, the arithmetic average numbers of results per round submitted by participating laboratories in the ASPAC 2011-12 Plant ILPP, plus concentration ranges for each test, averaged across the 12 samples.

2011-12 Plant tests	Symbol	Units	Number of participants			Concentration ranges (final) by test across 12 samples, as reported by labs		
			Oct 11	Feb 12	April 12	Minimum	Median	Maximum
Aluminium	Al	mg/kg	24	23	22	8.5	134	385
Boron	B	mg/kg	28	28	26	1.06	23.5	193
Cadmium	Cd	mg/kg	14	14	12	0.01	0.05	0.2
Calcium	Ca	%	31	34	32	0.07	0.84	3.7
Carbon	C	%	20	21	18	40	44	51
Chloride	Cl	%	21	23	20	0.05	0.32	1.32
Cobalt	Co	mg/kg	18	19	18	0.02	0.09	0.26
Copper	Cu	mg/kg	30	32	31	3.7	7.5	13.7
Iron	Fe	mg/kg	30	32	31	45	103	243
Lead	Pb	mg/kg	14	14	11	0.01	0.12	0.23
Magnesium	Mg	%	32	34	33	0.07	0.21	0.33
Manganese	Mn	mg/kg	30	32	31	17.6	56	2000
Molybdenum	Mo	mg/kg	22	20	21	0.07	0.22	17.2
Nitrogen	N	%	31	34	32	1.00	2.53	4.8
Nitrate-N†	NO_3-N	mg/kg	2	2	3	0.003	48	892
Phosphorus	P	%	32	34	34	0.07	0.28	0.68
Potassium	K	%	32	34	33	0.36	1.63	3.9
Selenium	Se	mg/kg	15	18	14	0.02	0.03	0.46
Silicon	Si	%	7	7	6	0.01	0.08	1.84
Sodium	Na	%	30	32	31	0.002	0.05	0.21
Sulphur	S	%	27	29	27	0.11	0.19	1.32
Zinc	Zn	mg/kg	30	32	31	11.7	29.8	72.5

† Concentration data for Nitrate-N are from small population averages.

All but one of the tests in Table 1 were assumed to be total concentrations in the plant material. The assumption is that all results were reported on a 65°C oven-dry basis, not on an "as received" basis. However, some results reported as "totals", such as Al and Si, may only reflect acid digestible concentrations.

Details of analytical methods used are not described in detail in this report. Method-indicating codes, however, are summarized in Tables 5 and 6 of Appendix 4, while relevant Codes are included with the "raw-data" tabulations in Appendix 4.

2.4 Sample preparation and identification

Before distribution to participants, potential samples were assessed for homogeneity. Specifically, 10 containers of each sample were selected at random from the sub-sampled batch, according to the principles described by Thompson and Wood (1993)[5]. These sub-samples were then tested in duplicate for plant total N, using Dumas combustion. The tests were conducted in one or more laboratories accredited to ISO 17025 standard. Several of the samples were also checked for the accidental presence of trace heavy metal contaminants, as earlier mentioned.

Results from homogeneity testing were subsequently statistically assessed according to ISO REMCO Protocol N231 "*Harmonised Proficiency Testing Protocol*" of January 1992. Variations between samples were such that all sample batches were considered to meet homogeneity criteria suited to proficiency testing. Examples of the homogeneity data and statistical assessments are summarised in Appendix 2.

In addition to testing for homogeneity, the plant samples were irradiated or otherwise rendered biologically benign to comply with international and/or national biosecurity regulations or requirements[6].

Ultimately, the samples used in the three "rounds" of the 2011-12 program were distributed and coded as follows: October 2011 – ASP 101-104; February 2012 – ASP 21-24; and April 2012 – ASP 41-44. The association between sample code and sample type is provided in Table 2. All 12 test plant samples were sourced from New Zealand.

Table 2. Sample identification and the origin of the samples included in the 2011-12 ASPAC plant ILPP.

Sample ID	*Sample type and origin*	*Sample ID*	*Sample type and origin*
ASP 101	Lentils (NZ)	ASP 23	Pine Needles (NZ)
ASP 102	Magnolia Leaves (NZ)	ASP 24	Whole Oats (NZ)
ASP 103	Pea Straw (NZ)	ASP 41	Broccoli (NZ)
ASP 104	Broccoli Leaves (NZ)	ASP 42	Hops (NZ)
ASP 21	Avocado Leaves (NZ)	ASP 43	Lucerne Chaff (NZ)
ASP 22	Oat Straw (NZ)	ASP 44	Tas. Blackwood (NZ)

[5] Thompson, M. and Wood, R. (1993). International harmonized protocol for proficiency testing of (chemical) analytical laboratories. *Journal of AOAC International* ***76*** (4): 926 – 940.

[6] Rayment, G.E. (2006). Australian efforts to prevent the accidental movement of pests and diseases in soil and plant samples. *Communications in Soil Science and Plant Analysis* **37**: 2107-2117.

2.5 Data analysis and periodic reporting

Laboratory results, after submission to GPL, were entered into a database and independently checked for data transfer accuracy prior to data processing. The non-parametric assessment of laboratory performance for each sample and method was performed by an iterative statistical procedure similar to that used in WEPAL inter-laboratory proficiency programs of Wageningen University. This procedure[7,8] is suited to datasets of as few as six to eight laboratories, although larger laboratory populations are best. An outline of the "median / MAD" statistical procedure is provided in Appendix 3, with terms described in Table 3.

In addition to medians and MADs, other statistical parameters (also described in Table 3) were calculated before and following the omission of non-conforming results. The "raw" data submitted by participating laboratories on a test-by-test basis are documented in Appendix 4, sometimes rounded for table formatting purposes.

Results submitted by each laboratory were expected to have three significant figures, unless protocol or common sense dictated otherwise. For example, the program accepted data where it was common to report measured concentrations to the nearest third decimal point, such as 0.001 mg/kg for the ultra-trace / trace metals and 0.001 % for Na, while two decimal places were accepted for other tests, rather than to three significant figures. However, the program (like others internationally) did not accept as a numeric value, a result reported as less than (<) or greater than (>) a specified number. In cases where the expected value was below the laboratory's lower limit of reporting, the expectation was that the laboratory would report a value half way between that value and zero. For high values, dilution was the expected option.

Interim reports for each "round", summarizing measurement performance relative to the performance of all laboratories that undertook the same test/s, were routinely and quickly emailed to participants. The main purpose of these Interim Reports was to provide timely feedback and to enable laboratories to take prompt remedial action where appropriate. Interim reports also provided an opportunity to correct for any data-transfer and data-processing misinterpretations. In addition, a Newsletter from the service provider occasionally went to all participating laboratories. Its main purpose was to assist in the interpretation of interim reports. Also included in the Service Provider's Newsletter was information about upcoming events and operational administration of the program.

Laboratories that participated in the 2011-12 plant ILPP all received from GPL (on behalf of ASPAC) a laboratory specific, confidential, Annual Summary Report. Each laboratory's data for the 12 plant samples, the aggregate data from all participants, other relevant statistical data, and whether or not the test/s received ASPAC Certification (if applicable), were provided. The laboratory code number was included.

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7 Rayment, G.E., Miller, R.O. and Sulaeman, E. (2000). Proficiency testing and other interactive measures to enhance analytical quality in soil and plant laboratories. *Communications in Soil Science and Plant Analysis* **31**: 1513-1530.

8 Whitehouse, M.W. (1987). Medians and MADs - Statistical methodology used at Wageningen, The Netherlands, for interlaboratory comparisons in the plant exchange program. Ag. Chem. Br. Report, ACU87/36. 10 pp. (Qld Dept. Primary Ind., Brisbane.)

Table 3. Statistical terms and their meanings in the context of this ASPAC annual report

Statistical term	*Meaning and/or derivation*
Count or number	Original population size.
Maximum i	The highest of a range of values, based on the initial data set.
Minimum i	The lowest of a range of values, based on the initial data set.
Median	The median is the score at the 50th percentile. It is the middle observation of a sequentially sorted array of numbers, except in the case of an even sample size. Here it is the arithmetic mean of the two observations in the middle of the sorted array of observations. The median of a reasonably sized array of numbers is insensitive to extreme scores.
Mean[A]	The arithmetic mean (or average) is the sum of the values of a variable divided by their number. It represents the point in a distribution of measurements about which the summed deviations equals zero. The arithmetic mean is sensitive to extreme measurements.
MAD	The Median of the Absolute Deviations, calculated as the median of the absolute values of the observations minus their median.
Interquartile range (IQR)	This is calculated by subtracting the score at the 25th percentile (referred to as the first quartile; Q_1) from the score at the 75th percentile (the third quartile; Q_3). This value is affected by the assumptions made in the calculation of the first and third quartiles, particularly for low population sizes. Moreover, these differences exist within and across statistical software packages. Prior to the 2004-05 rounds, ASPAC used the algorithm employed by EXCEL and some others. From the 2004-05 program, the algorithm employed has been that of SAS Method 4[9]. In summary, IQR = Q_3-Q_1.
Normalized IQR	This equates to IQR x 0.7413, where the latter is a normalizing factor.
Robust % CV[10]	The robust coefficient of variation (Robust % CV) = (100 x normalised IQR / median). For simplicity, the Robust %CV shown is for the initial results, and for "final" population of results for a test after the removal of "outliers" and perhaps "stragglers", usually following one or two iterations. Note that for Interim Reports, this term is estimated as = (100*MAD*1.483)/ Median, separately for "i" and "f" datasets.
Letter "i" and the letter "f" associated with medians, means, MADs, IQR and Robust %CVs.	The letter "i" relates to the initial data set. The letter "f" relates to the "final" data set, generated after one or two iterations typically after removal of laboratories with statistical "outliers" (if any), and statistical "stragglers" (if any).

A When the mean is greater than the median, the distribution is positively skewed. When the mean is lower than the median, the distribution is negatively skewed.

9 SAS Procedure Guide

10 "Guide to NATA Proficiency Testing". 27 pp. (National Association of Testing Authorities, Australia, December 1997).

2.6 ASPAC's criteria for certification of laboratories for plant tests

Subject to satisfactory measurement performance, typically for 12 samples across three sequential "rounds" in a twelve-month period, ASPAC awards participating laboratories with a printed, signed and dated *Certificate of Proficiency.* The *Certificate of Proficiency* identifies performance for each test that met criteria set by ASPAC. Certification for a given method / test (not laboratory accreditation) applies when a laboratory incurs no more than four demerit points for the 12 samples.

Demerit points (if any) were allocated through the identification of "outliers" and "stragglers" by the "median / MAD" statistical procedure mentioned earlier in this report. Appendix 3 provides details on how "outliers" and "stragglers" were identified. Two demerit points were allocated to each statistical "outlier", while a statistical "straggler" was allocated one demerit point. As no sample result could be both an "outlier" and a "straggler", a maximum of two demerit points is all that could accrue per sample for a specific test.

For any single "round" of four samples, three (3) was set as the maximum number of demerit points for a specific test. This was done so that unsatisfactory measurement for a test in one "round" did not in itself result in failure to be certified for that test across the three "rounds" in the designated 12-month period.

If a "round" was missed, the maximum number of three demerit points for every test in that "round" was allocated, unless very special circumstances applied and was known or advised expeditiously to the ASPAC-LPC through its Convenor. When the explanation was accepted, performance from the three most recently completed "rounds" was used to assess eligibility for certification. There were no "very special circumstances" in 2011-12.

Finally, when less than six laboratories submitted results for a particular test and/or sample, proficiency assessments could not be made statistically with an acceptable level of confidence and hence certification for the specific tests could not be granted. This applied to nitrate-N in this program year.

ASPAC's *Certificates of Proficiency* are only issued on completion of each annual program of three "rounds". Nowadays, ASPAC provides details of certified laboratories by test on its public web site. Certifications obtained in the 2011-12 Plants' program remained valid until superseded by findings from the following 2012-13 ILPP.

3. Summary Statistics

This section provides summary information and data (sometimes rounded only for table formatting purposes) on a test-by-test basis (alphabetical) for each of the 12 samples used across three "rounds" in 2011-12. The tabulations include values relevant to the iterative "median / MAD" procedure plus other parametric and robust statistics. For the meaning or derivation of the terms used in the tabulated summaries, see Table 3 and Appendix 3. All data are expressed on a dry weight basis. As nitrate-N results were supplied by insufficient laboratories for statistical assessments, there is no tabulation for this test, noting that mean values for the 12 samples ASP 101 to ASP 44 were 0.51, 27, 80, 892, 0.01, 69, 0.003, 0.003, 476, 366, 672, and 7.6 mg N/kg, respectively.

2011-12: Aluminium (mg Al/kg)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	24	24	24	24	23	23	23	23	22	22	22	22
Minimum	5.04	87.2	137	96.6	87.6	59.6	316	10.7	208	88.7	193	36.9
Maximum	76	309	654	239	233	139	500	62.1	353	227	337	79.9
Median i	8.94	128	333	137	123	78.2	387	21.4	269	150	250	55.6
Mean i	13.6	133	346	142	124	78.8	389	23	274	150	258	58.8
MAD i	1.97	10	60	9	9.48	6.4	24	3.2	11.9	15	15	6.1
IQR i	3.34	16.1	81.5	19.8	13.1	11.6	39.8	5.19	22.9	24.1	29.4	12.3
Robust CV % i	37	13	24	14	11	15	10	24	8.5	16	12	22
Median f	8.45	130	327	137	124	78	385	21.5	269	151	250	54.7
Mean f	8.8	130	329	139	122	76.1	384	21.3	268	152	250	56.7
MAD f	1.35	7.5	37	8	8	6	23	1.1	8	11.8	6.8	5.6
IQR f	2.78	12	70.1	12.5	12.4	11.4	36.5	1.72	12.2	22.2	12.2	10.7
Robust CV % f	33	9.3	21	9.1	10	15	9.5	8	4.5	15	4.9	20
Outliers	4	3	2	3	2	1	1	2	5	2	4	2
Stragglers	0	1	1	2	1	0	0	5	0	1	2	0

2011-12: Boron (mg B/kg)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	28	28	28	28	28	28	28	27	26	26	26	26
Minimum	0.705	47.3	18.4	20.6	12.9	1	9.83	0.177	19.3	24.2	25.9	18.5
Maximum	10.7	212	29.7	35.9	29.5	8.98	13.9	8.57	33.1	44.7	42.6	32.1
Median i	6.41	190	23.6	32.6	25	3.14	11.5	1.14	23.2	28.6	28.1	22.3
Mean i	6.39	174	23.7	32	24.5	3.21	11.5	1.66	23.2	29.4	28.8	22.7
MAD i	0.29	10	0.825	1.3	1.1	0.47	0.45	0.588	0.61	2.01	1.35	1.3
IQR i	0.615	27.1	1.5	2.02	1.63	0.662	0.625	0.793	0.852	2.72	1.96	1.8
Robust CV % i	9.6	14	6.4	6.2	6.5	21	5.4	70	3.7	9.5	7	8.1
Median f	6.4	193	23.8	32.7	25	3.14	11.5	1.06	23.2	28.4	27.9	21.8
Mean f	6.43	192	23.8	32.9	25	3.08	11.6	1.16	23.1	28.8	28.3	22.3
MAD f	0.13	7	0.9	0.93	0.9	0.39	0.3	0.445	0.5	1.8	1.2	1.3
IQR f	0.208	11.5	1.41	1.71	1.52	0.484	0.556	0.754	0.834	2.74	1.89	1.78
Robust CV % f	3.2	6	5.9	5.2	6.1	15	4.8	71	3.6	9.7	6.8	8.2
Outliers	10	7	3	3	3	3	2	2	3	1	1	1
Stragglers	1	0	0	0	0	1	1	1	1	0	0	0

2011-12: Cadmium (mg Cd/kg)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	14	14	14	14	14	14	14	14	12	12	12	12
Minimum	0.001	0.001	0.01	0.081	0.138	0.046	0.06	0.001	0.045	0.024	0.052	0.013
Maximum	0.887	0.009	0.054	0.186	0.314	0.336	0.294	0.063	0.059	0.048	0.069	0.035
Median i	0.012	0.006	0.041	0.168	0.209	0.084	0.083	0.017	0.05	0.031	0.062	0.016
Mean i	0.078	0.005	0.038	0.16	0.215	0.1	0.096	0.02	0.051	0.033	0.061	0.018
MAD i	0.007	0.002	0.002	0.012	0.019	0.002	0.003	0.004	0.002	0.003	0.002	0.002
IQR i	0.008	0.004	0.004	0.017	0.034	0.003	0.005	0.009	0.002	0.006	0.003	0.004
Robust CV % i	72	66	9.3	10	16	3.6	6.1	51	4.8	18	5.3	26
Median f	0.01	0.006	0.041	0.172	0.209	0.084	0.082	0.017	0.05	0.029	0.062	0.016
Mean f	0.012	0.005	0.042	0.169	0.214	0.084	0.081	0.016	0.05	0.03	0.062	0.017
MAD f	0.005	0.002	0.001	0.009	0.011	0.001	0.002	0.001	0.002	0.003	0.002	0.002
IQR f	0.008	0.004	0.003	0.015	0.025	0.002	0.004	0.002	0.003	0.004	0.002	0.004
Robust CV % f	81	66	8.3	8.7	12	1.9	5.4	11	5.2	14	3.8	23
Outliers	2	0	3	1	1	4	3	3	1	2	1	1
Stragglers	0	0	0	1	1	1	0	3	0	0	2	0

2011-12: Calcium (%Ca)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	31	31	31	31	34	34	34	34	32	32	33	32
Minimum	0.038	0.149	0.135	2.29	0.78	0.22	0.323	0.034	0.366	0.47	0.714	0.204
Maximum	0.95	1.77	1.74	4.29	3.76	2.24	2.36	1.69	2.53	1.73	4.98	4.83
Median i	0.081	1.44	1.35	3.68	1.01	0.275	0.413	0.068	0.656	0.735	1.29	0.95
Mean i	0.11	1.4	1.34	3.59	1.07	0.326	0.466	0.114	0.722	0.771	1.4	1.07
MAD i	0.003	0.05	0.05	0.09	0.039	0.01	0.019	0.005	0.016	0.034	0.05	0.042
IQR i	0.005	0.075	0.082	0.133	0.06	0.017	0.03	0.007	0.026	0.051	0.078	0.064
Robust CV % i	6	5.2	6	3.6	6	6.3	7.2	10	4	7	6	6.8
Median f	0.081	1.45	1.35	3.69	1.02	0.276	0.414	0.068	0.652	0.734	1.3	0.936
Mean f	0.081	1.44	1.36	3.67	1.01	0.272	0.412	0.068	0.655	0.734	1.31	0.93
MAD f	0.002	0.046	0.045	0.05	0.03	0.009	0.016	0.004	0.006	0.022	0.04	0.03
IQR f	0.003	0.073	0.076	0.082	0.041	0.012	0.028	0.006	0.011	0.033	0.067	0.047
Robust CV % f	3.2	5	5.6	2.2	4	4.4	6.8	8.7	1.7	4.4	5.1	5.1
Outliers	4	3	3	5	6	6	4	5	7	7	6	6
Stragglers	4	0	0	3	1	0	1	2	4	2	0	3

2011-12: Carbon (%C)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	20	20	20	20	21	21	21	21	18	18	18	18
Minimum	41.1	41.7	39.4	36.8	43.8	42.3	46.5	40.9	39.7	46.9	40.9	48.8
Maximum	51.6	48.1	47.1	41.1	53	50.2	53	51.6	45.1	50.7	45.5	54.4
Median i	43.2	44.1	42	39.5	47.6	45	49.6	45.2	42.8	48.7	43.5	50.8
Mean i	43.6	44.3	41.8	39.2	47.6	45.3	49.5	45.2	42.6	48.7	43.2	50.9
MAD i	1.03	0.8	0.97	0.75	0.5	0.9	0.7	0.8	0.45	0.3	0.3	0.7
IQR i	1.52	1.25	1.93	1.46	1.15	1.3	1.48	1.59	0.63	0.5	0.575	1.02
Robust CV % i	3.5	2.8	4.6	3.7	2.4	2.9	3	3.5	1.5	1	1.3	2
Median f	43.1	43.9	42	39.5	47.6	45	49.7	45.2	42.8	48.8	43.5	50.7
Mean f	43.2	44.1	41.5	39.2	47.7	44.8	49.7	45.2	42.7	48.8	43.5	50.6
MAD f	1.1	1	0.94	0.75	0.3	0.8	0.3	0.6	0.3	0.3	0.19	0.56
IQR f	1.63	1.19	1.93	1.46	0.482	1.48	0.482	0.964	0.482	0.371	0.33	0.982
Robust CV % f	3.8	2.7	4.6	3.7	1	3.3	0.97	2.1	1.1	0.76	0.76	1.9
Outliers	1	1	1	0	6	2	4	2	4	3	4	2
Stragglers	0	0	0	0	3	0	5	3	0	0	1	0

2011-12: Chloride (%Cl)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	21	21	21	21	23	23	23	23	20	20	20	20
Minimum	0.04	0.205	1.06	0.54	0.05	0.598	0.07	0.01	0.178	0.043	0.644	0.437
Maximum	0.105	0.374	1.63	1	0.16	0.895	0.195	0.1	0.485	0.485	0.878	0.709
Median i	0.09	0.289	1.33	0.821	0.08	0.77	0.152	0.046	0.357	0.171	0.729	0.538
Mean i	0.086	0.294	1.35	0.825	0.088	0.752	0.151	0.048	0.36	0.219	0.732	0.547
MAD i	0.005	0.019	0.04	0.031	0.009	0.022	0.007	0.006	0.014	0.016	0.023	0.018
IQR i	0.007	0.034	0.096	0.053	0.022	0.05	0.011	0.01	0.022	0.106	0.038	0.028
Robust CV % i	7.6	12	7.2	6.5	28	6.5	7.3	21	6.2	62	5.3	5.2
Median f	0.09	0.287	1.32	0.821	0.074	0.772	0.152	0.046	0.355	0.161	0.729	0.536
Mean f	0.09	0.288	1.32	0.823	0.077	0.77	0.151	0.047	0.352	0.164	0.73	0.535
MAD f	0.002	0.011	0.02	0.024	0.003	0.013	0.004	0.005	0.005	0.009	0.014	0.014
IQR f	0.003	0.018	0.03	0.038	0.009	0.025	0.006	0.008	0.012	0.009	0.018	0.019
Robust CV % f	3.4	6.2	2.2	4.7	13	3.2	4	17	3.3	5.5	2.4	3.5
Outliers	3	3	6	4	3	5	5	4	3	7	2	4
Stragglers	4	1	2	1	4	1	2	0	2	0	2	1

2011-12: Cobalt (mg Co/kg)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	18	18	18	18	19	19	19	19	18	18	18	18
Minimum	0.02	0.01	0.085	0.048	0.062	0.015	0.075	0.095	0.125	0.111	0.06	0.004
Maximum	0.085	0.12	0.19	0.14	0.135	0.16	0.25	1.64	0.82	1.05	0.205	0.77
Median i	0.033	0.063	0.119	0.09	0.087	0.047	0.084	0.255	0.182	0.156	0.191	0.029
Mean i	0.036	0.065	0.123	0.09	0.092	0.051	0.093	0.367	0.215	0.207	0.177	0.072
MAD i	0.003	0.013	0.01	0.021	0.011	0.004	0.004	0.116	0.012	0.021	0.007	0.009
IQR i	0.006	0.02	0.017	0.032	0.019	0.004	0.007	0.212	0.018	0.036	0.018	0.019
Robust CV % i	17	32	14	35	22	9.5	8.6	83	9.8	23	9.3	64
Median f	0.033	0.063	0.118	0.09	0.086	0.047	0.083	0.255	0.182	0.152	0.192	0.024
Mean f	0.033	0.065	0.116	0.09	0.087	0.046	0.085	0.296	0.183	0.157	0.192	0.027
MAD f	0.001	0.012	0.009	0.021	0.01	0.002	0.005	0.11	0.011	0.019	0.003	0.005
IQR f	0.002	0.019	0.014	0.032	0.016	0.004	0.007	0.195	0.017	0.032	0.004	0.01
Robust CV % f	4.8	30	12	35	18	8.5	7.8	77	9.1	21	1.8	40
Outliers	4	2	2	0	2	2	1	1	2	1	3	2
Stragglers	2	0	0	0	0	2	0	0	0	0	3	1

2011-12: Copper (mg Cu/kg)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	30	30	30	30	32	32	32	32	31	31	31	31
Minimum	7.79	6.39	4.26	4.43	9.35	5.3	5.09	0.2	2.78	7.8	4.58	3.78
Maximum	9.67	16.4	12.6	8.55	25	8	7.2	13.3	10.3	25.2	27.3	18.9
Median i	8.54	13.7	7.22	5.27	11.6	7.29	6.39	10.1	3.75	13.5	5.95	7.67
Mean i	8.56	13.4	7.36	5.39	12.1	7.1	6.27	9.57	4.11	14.1	6.69	8.16
MAD i	0.375	0.4	0.285	0.205	0.6	0.28	0.195	1.03	0.25	2.1	0.37	0.41
IQR i	0.589	0.612	0.495	0.326	0.908	0.617	0.328	1.65	0.385	3.48	0.615	0.593
Robust CV % i	6.9	4.5	6.9	6.2	7.8	8.5	5.1	16	10	26	10	7.7
Median f	8.54	13.7	7.2	5.27	11.6	7.41	6.43	10.2	3.69	13.5	5.91	7.63
Mean f	8.56	13.7	7.24	5.25	11.7	7.42	6.4	10.2	3.67	13.8	5.86	7.72
MAD f	0.375	0.3	0.23	0.14	0.6	0.15	0.105	0.74	0.2	2.1	0.31	0.335
IQR f	0.589	0.445	0.341	0.232	0.797	0.252	0.159	1.27	0.317	3.32	0.482	0.532
Robust CV % f	6.9	3.2	4.7	4.4	6.9	3.4	2.5	12	8.6	25	8.2	7
Outliers	0	4	5	3	2	5	6	3	4	1	5	4
Stragglers	0	1	0	3	0	4	4	1	1	0	0	1

2011-12: Iron (mg Fe/kg)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	30	30	30	30	32	32	32	32	31	31	31	31
Minimum	12.9	56.6	152	74.6	96.5	55.5	67.4	19.9	109	31	154	51.6
Maximum	81.1	103	362	149	169	140	129	77.5	420	358	322	224
Median i	68.1	76.5	221	103	121	104	89.2	44.9	173	244	232	70
Mean i	64.1	76.1	222	103	121	102	90.5	45.3	180	236	235	80
MAD i	3.1	4.15	20.4	6.56	6	4.6	4.5	2.85	9	10	7	3.9
IQR i	6.38	6.63	33	9.29	10.9	7.75	6.63	4.8	13.3	14.1	11.9	8.52
Robust CV % i	9.4	8.7	15	9	9	7.5	7.4	11	7.7	5.8	5.1	12
Median f	68.2	76.5	221	103	121	104	89	44.8	173	244	232	69
Mean f	67.4	76.2	219	103	120	103	88.8	45.1	174	243	232	69.4
MAD f	2.7	2.3	18	5	5	4	4.2	1.9	6.8	6.5	4	2.5
IQR f	4.45	4.08	25	8.54	7.78	5.78	5.86	2.74	10.4	11.1	6.17	4.49
Robust CV % f	6.5	5.3	11	8.3	6.4	5.6	6.6	6.1	6	4.6	2.7	6.5
Outliers	4	4	3	2	3	5	5	6	4	5	9	7
Stragglers	1	3	1	1	1	0	0	3	1	2	2	1

2011-12: Lead (mg Pb/kg)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	14	14	14	14	14	14	14	14	11	11	11	11
Minimum	0.007	0.087	0.09	0.01	0.02	0.14	0.144	0.007	0.03	0.03	0.03	0.03
Maximum	0.185	0.95	0.8	0.6	0.5	0.4	0.4	0.128	0.178	0.148	0.172	0.17
Median i	0.015	0.123	0.224	0.103	0.141	0.231	0.223	0.043	0.144	0.12	0.128	0.105
Mean i	0.034	0.189	0.259	0.13	0.177	0.232	0.23	0.055	0.134	0.113	0.123	0.113
MAD i	0.007	0.03	0.016	0.01	0.024	0.012	0.016	0.022	0.008	0.016	0.004	0.025
IQR i	0.015	0.062	0.035	0.016	0.047	0.026	0.025	0.04	0.025	0.029	0.007	0.035
Robust CV % i	100	51	16	15	33	11	11	95	18	24	5.8	33
Median f	0.01	0.117	0.22	0.105	0.128	0.232	0.223	0.043	0.144	0.12	0.127	0.105
Mean f	0.011	0.122	0.215	0.104	0.129	0.234	0.223	0.055	0.141	0.121	0.126	0.113
MAD f	0.003	0.023	0.012	0.005	0.003	0.003	0.011	0.022	0.007	0.015	0.003	0.025
IQR f	0.005	0.034	0.021	0.008	0.006	0.007	0.017	0.04	0.017	0.028	0.006	0.035
Robust CV % f	52	30	9.5	7.8	4.6	2.9	7.8	95	12	24	4.5	33
Outliers	3	1	4	3	4	3	2	0	2	1	3	0
Stragglers	2	1	0	0	3	3	0	0	0	0	0	0

2011-12: Magnesium (%Mg)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	32	32	32	32	34	34	34	34	33	33	33	33
Minimum	0.068	0.256	0.297	0.209	0.268	0.099	0.057	0.065	0.131	0.197	0.159	0.165
Maximum	0.116	0.331	0.399	0.35	0.395	0.234	0.099	0.205	0.27	0.462	0.42	0.407
Median i	0.103	0.287	0.329	0.25	0.307	0.122	0.069	0.133	0.158	0.306	0.213	0.213
Mean i	0.102	0.289	0.334	0.254	0.309	0.127	0.071	0.135	0.164	0.307	0.223	0.228
MAD i	0.003	0.01	0.009	0.009	0.012	0.004	0.003	0.006	0.006	0.013	0.01	0.012
IQR i	0.004	0.014	0.015	0.013	0.019	0.007	0.004	0.01	0.009	0.026	0.016	0.022
Robust CV % i	4.3	5	4.5	5.3	6	5.9	6.6	7.2	5.9	8.6	7.3	10
Median f	0.103	0.287	0.328	0.249	0.307	0.121	0.067	0.132	0.157	0.304	0.211	0.213
Mean f	0.103	0.287	0.33	0.25	0.304	0.121	0.068	0.133	0.157	0.301	0.21	0.215
MAD f	0.003	0.009	0.008	0.007	0.011	0.003	0.003	0.005	0.003	0.011	0.008	0.01
IQR f	0.004	0.013	0.014	0.012	0.017	0.004	0.003	0.008	0.006	0.018	0.014	0.015
Robust CV % f	4	4.5	4.3	5	5.4	2.9	4.6	5.9	3.5	5.8	6.6	6.9
Outliers	3	2	4	4	2	7	6	5	5	5	5	4
Stragglers	0	1	1	0	2	3	0	0	3	2	0	1

2011-12: Manganese (mg Mn/kg)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	30	30	30	30	32	32	32	32	31	31	31	31
Minimum	10.2	1520	13.8	34.1	68.8	60.4	87.3	26	29.8	58.2	28	31.9
Maximum	20.8	2280	23.4	56	95.5	98.2	168	59	58	122	65.1	668
Median i	17.5	1987	17.7	41.8	80.9	70.5	104	46.5	39.5	65.3	33.3	365
Mean i	17.1	1960	18.1	42.1	80.6	70.7	106	46.3	39.8	68.7	34.7	363
MAD i	0.73	125	1.04	1.45	3.03	2.48	4	2.5	1.5	1.9	0.9	15
IQR i	1.17	210	1.41	2.24	4.9	3.41	6.3	3.73	2.13	3.04	1.36	25.9
Robust CV % i	6.7	11	8	5.4	6.1	4.8	6.1	8	5.4	4.7	4.1	7.1
Median f	17.6	2000	17.7	41.7	80.9	70.5	104	46.5	39.1	65.1	33.3	365
Mean f	17.5	1980	17.7	41.4	80.5	70.4	104	46.6	39.2	65.2	33.4	365
MAD f	0.6	122	0.6	1.21	2.9	1.8	4	2.4	1.2	1.3	0.7	15
IQR f	0.927	195	1.2	1.85	4.31	2.97	5.56	3.56	1.82	2.04	1.11	22.2
Robust CV % f	5.3	9.7	6.8	4.4	5.3	4.2	5.3	7.7	4.6	3.1	3.3	6.1
Outliers	5	1	4	4	4	4	3	3	4	5	5	4
Stragglers	0	0	2	1	0	1	0	1	2	1	1	0

2011-12: Molybdenum (mg Mo/kg)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	22	22	21	22	20	20	20	20	21	20	21	20
Minimum	15.1	0.01	0.02	4	0.125	0.067	0.142	0.24	0.2	0.002	0.05	0.002
Maximum	20.1	0.732	0.385	6.03	0.48	0.187	0.266	0.59	27.2	1.17	2.78	1.03
Median i	17.3	0.136	0.077	5.08	0.19	0.156	0.224	0.47	0.69	0.222	0.591	0.071
Mean i	17.3	0.19	0.104	5.02	0.204	0.152	0.225	0.46	1.96	0.273	0.728	0.123
MAD i	0.575	0.046	0.02	0.265	0.021	0.012	0.016	0.014	0.024	0.021	0.019	0.016
IQR i	0.917	0.112	0.039	0.597	0.032	0.02	0.025	0.033	0.051	0.061	0.042	0.026
Robust CV % i	5.3	82	50	12	17	13	11	7.1	7.4	28	7	36
Median f	17.2	0.104	0.075	5.1	0.187	0.156	0.224	0.47	0.689	0.218	0.597	0.067
Mean f	17.2	0.106	0.074	5.15	0.184	0.158	0.23	0.47	0.687	0.219	0.601	0.067
MAD f	0.5	0.031	0.016	0.123	0.018	0.007	0.014	0.008	0.015	0.01	0.013	0.012
IQR f	0.741	0.04	0.029	0.2	0.029	0.014	0.025	0.013	0.023	0.02	0.03	0.017
Robust CV % f	4.3	38	38	3.9	16	9	11	2.8	3.3	9.3	5	25
Outliers	5	5	3	2	2	2	1	8	4	6	4	4
Stragglers	0	1	0	5	0	1	0	1	1	2	1	0

2011-12: Nitrogen (%N)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	31	31	31	31	34	34	34	34	32	32	32	32
Minimum	3.43	1.35	0.766	0.37	1.3	0.855	1.25	1.43	4.2	2.5	2.36	2.53
Maximum	4.96	2.28	2.35	4.32	2.61	1.31	2.1	1.92	5.22	3.04	3.59	3.22
Median i	4.12	1.53	1.01	3.83	2.38	1.12	1.86	1.77	4.78	2.8	3.29	2.67
Mean i	4.12	1.56	1.06	3.71	2.34	1.11	1.83	1.76	4.74	2.8	3.26	2.69
MAD i	0.14	0.055	0.06	0.13	0.065	0.06	0.05	0.055	0.175	0.06	0.07	0.045
IQR i	0.222	0.122	0.096	0.185	0.106	0.091	0.08	0.091	0.25	0.115	0.106	0.076
Robust CV % i	5.4	8	9.5	4.8	4.4	8.1	4.3	5.1	5.2	4.1	3.2	2.8
Median f	4.13	1.53	1	3.85	2.38	1.12	1.87	1.79	4.78	2.8	3.29	2.67
Mean f	4.13	1.53	1	3.86	2.38	1.13	1.86	1.79	4.74	2.79	3.29	2.67
MAD f	0.13	0.048	0.06	0.115	0.05	0.06	0.035	0.05	0.175	0.06	0.07	0.04
IQR f	0.204	0.075	0.089	0.178	0.067	0.093	0.063	0.078	0.25	0.096	0.096	0.058
Robust CV % f	4.9	4.9	8.9	4.6	2.8	8.3	3.4	4.3	5.2	3.4	2.9	2.2
Outliers	3	2	4	5	6	2	5	3	0	3	3	3
Stragglers	0	1	0	0	1	0	1	1	0	0	0	1

2011-12: Phosphorus (%P)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	32	32	32	32	34	34	34	34	34	34	34	34
Minimum	0.28	0.094	0.041	0.378	0.113	0.118	0.076	0.183	0.33	0.128	0.17	0.11
Maximum	0.382	0.188	0.1	0.59	0.245	0.267	0.19	0.516	1.02	0.763	0.514	0.316
Median i	0.326	0.12	0.067	0.434	0.226	0.234	0.167	0.392	0.684	0.5	0.326	0.133
Mean i	0.326	0.122	0.066	0.436	0.219	0.229	0.162	0.385	0.682	0.49	0.329	0.142
MAD i	0.007	0.005	0.003	0.016	0.008	0.008	0.006	0.016	0.037	0.019	0.01	0.007
IQR i	0.011	0.008	0.004	0.025	0.013	0.012	0.009	0.024	0.056	0.036	0.016	0.011
Robust CV % i	3.4	7	5.5	5.8	5.9	5	5.7	6.1	8.2	7.1	4.8	8.1
Median f	0.327	0.119	0.067	0.434	0.227	0.235	0.168	0.392	0.68	0.5	0.327	0.131
Mean f	0.326	0.118	0.067	0.433	0.226	0.235	0.167	0.394	0.677	0.496	0.325	0.13
MAD f	0.005	0.005	0.002	0.015	0.007	0.006	0.004	0.014	0.034	0.016	0.004	0.007
IQR f	0.008	0.008	0.003	0.022	0.01	0.009	0.006	0.019	0.05	0.025	0.008	0.011
Robust CV % f	2.5	6.4	4.2	5.1	4.3	3.9	3.3	4.9	7.4	5	2.4	8.1
Outliers	9	4	4	2	3	5	5	5	3	4	6	3
Stragglers	0	0	2	0	1	3	4	1	0	3	3	1

2011-12: Potassium (%K)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	32	32	32	32	33	33	34	34	33	33	33	33
Minimum	0.799	0.85	2.23	2.65	1.19	1.35	0.56	0.174	2.42	0.76	2.5	0.663
Maximum	1.12	1.12	2.94	4.24	1.59	2.1	1.77	0.573	4.98	3.55	4.35	8.11
Median i	0.892	0.992	2.51	3.93	1.45	1.78	0.682	0.356	3.72	2.53	3.14	0.809
Mean i	0.896	0.984	2.51	3.85	1.43	1.77	0.714	0.362	3.71	2.45	3.1	1.13
MAD i	0.026	0.032	0.075	0.125	0.06	0.07	0.031	0.031	0.13	0.12	0.1	0.046
IQR i	0.037	0.055	0.109	0.161	0.096	0.111	0.043	0.045	0.2	0.17	0.167	0.095
Robust CV % i	4.2	5.5	4.4	4.1	6.6	6.2	6.3	13	5.4	6.7	5.3	12
Median f	0.892	0.998	2.51	3.94	1.47	1.78	0.678	0.356	3.75	2.56	3.15	0.79
Mean f	0.895	0.996	2.5	3.94	1.44	1.78	0.678	0.356	3.75	2.57	3.15	0.795
MAD f	0.02	0.029	0.07	0.1	0.06	0.07	0.013	0.024	0.13	0.09	0.09	0.02
IQR f	0.036	0.04	0.106	0.159	0.082	0.111	0.019	0.033	0.193	0.126	0.141	0.029
Robust CV % f	4	4	4.2	4	5.5	6.2	2.8	9.3	5.1	4.9	4.5	3.6
Outliers	4	4	2	3	2	3	5	5	4	5	6	5
Stragglers	1	1	0	0	0	0	3	0	0	1	0	7

2011-12: Selenium (mg Se/kg)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	15	15	15	15	18	18	18	18	14	14	14	14
Minimum	0.088	0.02	0.008	0.07	0.015	0.015	0.048	0.015	0.051	0.002	0.005	0.015
Maximum	0.54	0.194	0.087	0.4	2.29	1.94	2.12	2.22	0.352	0.075	0.1	0.228
Median i	0.451	0.039	0.02	0.126	0.101	0.04	0.058	0.028	0.193	0.021	0.018	0.035
Mean i	0.378	0.056	0.026	0.149	0.259	0.171	0.195	0.173	0.203	0.028	0.028	0.053
MAD i	0.017	0.009	0.008	0.016	0.025	0.017	0.009	0.01	0.013	0.016	0.004	0.008
IQR i	0.182	0.029	0.014	0.025	0.121	0.049	0.039	0.02	0.022	0.027	0.015	0.022
Robust CV % i	40	75	71	19	120	120	67	70	11	130	84	63
Median f	0.456	0.032	0.017	0.124	0.085	0.029	0.052	0.021	0.192	0.021	0.017	0.033
Mean f	0.454	0.034	0.019	0.123	0.09	0.032	0.052	0.025	0.194	0.028	0.017	0.032
MAD f	0.009	0.004	0.007	0.015	0.01	0.007	0.002	0.005	0.009	0.016	0.002	0.003
IQR f	0.017	0.007	0.012	0.022	0.021	0.011	0.003	0.011	0.018	0.027	0.004	0.006
Robust CV % f	3.7	21	69	18	24	38	5.1	51	9.3	130	23	19
Outliers	5	2	2	2	5	3	6	3	3	0	3	3
Stragglers	1	2	0	1	2	3	2	2	0	0	2	2

2011-12: Silicon (%Si)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	7	7	7	7	7	7	7	7	6	6	6	6
Minimum	0.001	0.019	0.018	0.006	0.001	0.003	0.005	0.001	0.03	0.04	0.03	0.015
Maximum	0.021	1.92	0.167	0.076	0.23	0.68	0.035	0.11	0.088	0.45	0.209	0.047
Median i	0.011	1.74	0.091	0.049	0.201	0.22	0.029	0.076	0.035	0.388	0.126	0.043
Mean i	0.011	1.1	0.084	0.046	0.138	0.277	0.026	0.063	0.044	0.292	0.109	0.037
MAD i	0.007	0.18	0.019	0.022	0.029	0.175	0.006	0.03	0.005	0.058	0.042	0.004
IQR i	0.012	1.38	0.059	0.032	0.122	0.392	0.011	0.036	0.021	0.295	0.084	0.017
Robust CV % i	110	79	65	66	61	180	39	48	61	76	67	39
Median f	0.011	1.84	0.091	0.049	0.214	0.22	0.029	0.076	0.033	0.441	0.126	0.046
Mean f	0.011	1.84	0.084	0.046	0.215	0.277	0.026	0.063	0.036	0.442	0.109	0.045
MAD f	0.007	0.065	0.019	0.022	0.007	0.175	0.006	0.03	0.003	0.007	0.042	0.001
IQR f	0.012	0.119	0.059	0.032	0.016	0.392	0.011	0.036	0.009	0.012	0.084	0.003
Robust CV % f	110	6.4	65	66	7.6	180	39	48	28	2.7	67	7.1
Outliers	0	3	0	0	3	0	0	0	1	2	0	1
Stragglers	0	0	0	0	0	0	0	0	0	1	0	1

2011-12: Sodium (%Na)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	30	30	30	30	31	32	32	31	31	31	31	32
Minimum	0.0003	0.005	0.12	0.163	0.005	0.008	0.031	0.0001	0.044	0.002	0.02	0.036
Maximum	0.061	0.056	0.162	0.266	0.157	0.117	0.062	0.073	0.16	0.111	0.076	0.43
Median i	0.002	0.009	0.141	0.215	0.008	0.09	0.041	0.003	0.065	0.011	0.049	0.099
Mean i	0.007	0.012	0.14	0.215	0.014	0.088	0.042	0.006	0.071	0.018	0.049	0.111
MAD i	0.001	0.001	0.006	0.011	0.001	0.002	0.002	0.001	0.003	0.001	0.002	0.005
IQR i	0.002	0.002	0.009	0.017	0.002	0.004	0.002	0.001	0.005	0.002	0.003	0.008
Robust CV % i	96	20	6.6	8	28	4	6	49	7.6	15	6.3	7.9
Median f	0.002	0.009	0.141	0.214	0.008	0.09	0.041	0.003	0.064	0.011	0.05	0.098
Mean f	0.001	0.009	0.14	0.214	0.008	0.09	0.041	0.003	0.065	0.011	0.05	0.099
MAD f	0.001	0.001	0.005	0.009	0.001	0.002	0.001	0.001	0.002	0.001	0.002	0.004
IQR f	0.001	0.001	0.008	0.013	0.002	0.003	0.001	0.001	0.003	0.001	0.003	0.005
Robust CV % f	59	15	5.9	6.2	22	3.1	2.2	50	5.2	7	5.9	5.3
Outliers	5	6	2	3	4	7	4	2	7	10	5	5
Stragglers	1	0	2	0	1	0	7	0	0	0	1	2

2011-12: Sulfur (%S)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	27	27	27	27	29	29	29	29	27	27	27	27
Minimum	0.188	0.086	0.119	1.00	0.181	0.12	0.103	0.07	0.7	0.12	0.265	0.04
Maximum	1.11	0.154	0.17	1.69	0.262	0.197	0.157	0.227	1.23	0.418	0.555	0.332
Median i	0.211	0.106	0.152	1.32	0.222	0.163	0.127	0.154	0.845	0.21	0.344	0.175
Mean i	0.245	0.107	0.152	1.33	0.221	0.16	0.127	0.151	0.864	0.22	0.35	0.184
MAD i	0.006	0.005	0.005	0.04	0.007	0.006	0.004	0.006	0.025	0.008	0.015	0.007
IQR i	0.01	0.007	0.008	0.054	0.011	0.008	0.006	0.01	0.039	0.017	0.021	0.013
Robust CV % i	4.9	7	5.4	4.1	4.8	4.8	4.7	6.3	4.6	8.1	6	7.6
Median f	0.211	0.106	0.152	1.32	0.222	0.163	0.128	0.154	0.848	0.21	0.343	0.172
Mean f	0.211	0.106	0.152	1.31	0.223	0.162	0.128	0.155	0.85	0.207	0.338	0.174
MAD f	0.006	0.005	0.005	0.035	0.005	0.004	0.003	0.006	0.013	0.007	0.012	0.007
IQR f	0.009	0.007	0.007	0.052	0.009	0.007	0.005	0.008	0.019	0.015	0.016	0.008
Robust CV % f	4.2	6.5	4.9	3.9	4	4.1	3.5	5.1	2.3	7.1	4.5	4.6
Outliers	3	3	2	3	5	5	4	4	4	6	3	5
Stragglers	0	2	0	0	1	1	2	0	5	0	1	0

2011-12: Zinc (mg Zn/kg)

Statistical parameters	Plant sample identification and values											
	October 2011 (Round 111)				*February 2012 (Round 311)*				*April 2012 (Round 511)*			
	ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
No of results	30	30	30	30	32	32	32	32	31	31	31	31
Minimum	44.8	6.22	18.1	26.0	30.2	20.7	55.4	14.7	28.2	32.9	19	16.3
Maximum	69.8	16.1	25.7	51	45.6	30.2	79.2	32.1	45	57	39.3	36
Median i	50.2	11.7	22.3	34.2	42.1	26.4	71.8	26.9	32.5	39.3	20.8	20.7
Mean i	50.7	11.7	22.1	34.7	41.7	26	70.9	25.8	33	40.2	21.8	21.3
MAD i	1.2	0.4	0.8	1.2	1.35	0.9	2.69	1.55	1	2.2	0.8	1.4
IQR i	1.82	0.575	1.11	1.98	1.95	1.73	4.15	2.21	1.48	3.85	1.33	2.08
Robust CV % i	3.6	4.9	5	5.8	4.6	6.6	5.8	8.2	4.6	9.8	6.4	10
Median f	50.2	11.7	22.4	33.9	42.2	26.7	72.5	27	32.5	39	20.6	20.6
Mean f	50.3	11.7	22.3	33.9	42.4	26.6	71.7	26.9	32.6	38.9	20.5	20.6
MAD f	0.9	0.15	0.7	0.64	1.1	0.55	2.75	1.2	0.75	1.85	0.615	1.3
IQR f	1.48	0.352	1.07	1.11	1.74	0.852	3.87	1.89	1.06	2.78	1.09	2
Robust CV % f	3	3	4.8	3.3	4.1	3.2	5.3	7	3.3	7.1	5.3	9.7
Outliers	6	7	3	4	2	5	2	6	6	3	4	2
Stragglers	1	3	0	3	1	3	0	0	1	0	1	0

4. Comments on Measurement Performance

Full evaluation of measurement performance is beyond the scope of this report. Such evaluations are typically made at ASPAC Workshops and in other national and international fora. It is appropriate, however, to make a few observations.

The grand median robust % CVs across the 12 samples by test in 2011-12, after the removal of "outliers" and "stragglers", ranged from 2.0 (for C) to 43.5 (for Si), which is a narrower range than for corresponding tests in both 2009-10 and 2010-11. Figure 1(a) presents, in ascending order, the grand median robust %CVs for the 2011-12 program (nitrate-N excluded), while Figure 1 (b) shows grand median robust %CVs for 2010-11. Although not identical, there are many similarities with respect to the values for %CVs across the elements.

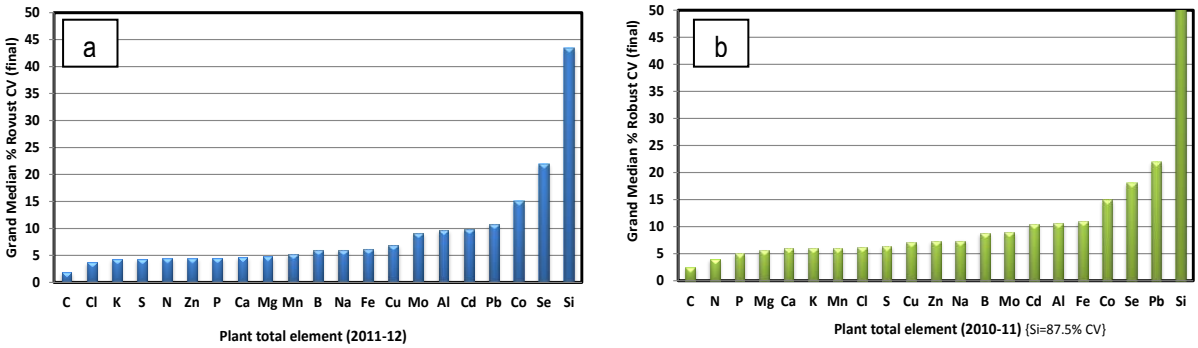

Figure 1. Grand median robust %CVs (final) for the 2011-12 [a] and 2010-11 [b] plant-program years.

Across all reported plant test results in 2011-12 (total of 6,306, excluding nitrate-N), 13.8% were statistically assessed to be "outliers". The corresponding figure for "stragglers" was 4.6%. Both of those percentages were slightly greater than the equivalents in 2010-11. For individual elements, the range of "outliers", expressed as percentages of the number of reported results for the particular test, ranged from 10% (Co and N) to 19.7% (Se), while those for "stragglers" ranged from 0.2% (Si) to 3.3% (N) of reported results for the specified test.

Additionally on "outliers" and "stragglers", Figure 2 presents linear relationships between the numbers of reported results by test and average numbers of statistical "outliers" and "stragglers" in 2011-12, respectively. The trend on this occasion for average numbers of "outliers" and "stragglers" to increase as the average number of reported results for a given test increased was quite strong for "outliers" and less so for "stragglers".

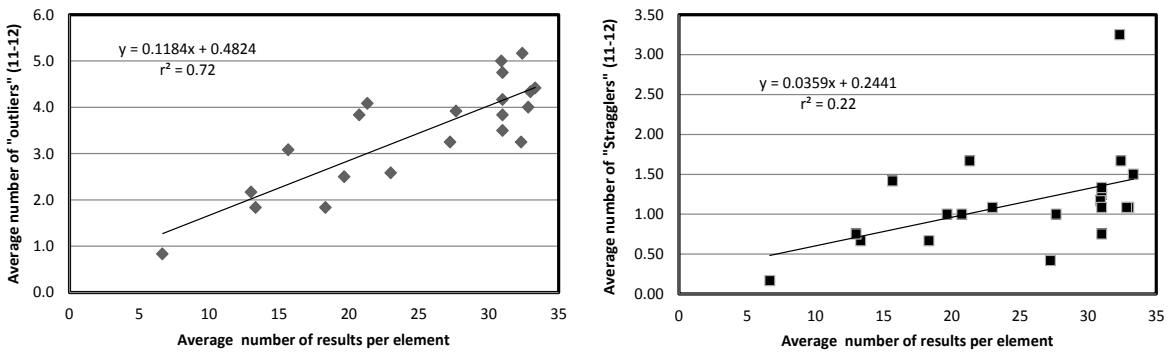

Figure 1. Trends in the average numbers of "outliers" and "stragglers" with average numbers of reported results for 21 plant elemental tests in 2011-12.

As earlier shown, expected uncertainties associated with laboratory measurements are approximated via the Horwitz function[11,12,13]. It follows that %CV data alone (i.e., in the absence of consideration of analyte concentrations) have limited utility as a measure of measurement performance over time. Accordingly, continuous relationships for robust %CVs (finals) and corresponding concentrations for all 12 test samples and for all 21 total elements, respectively, were plotted, with power functions used for trend assessments.

Thirteen of these relationships trended as expected. The remainder lacked a convincing relationship (Co, Cu, Fe, P, K, Zn) or followed a weak reverse trend (Mg, Mn). The two strongest expected trends, with coefficients of determination (r^2) of 0.70 and 0.60 were for Na and Cl. These two trends are shown in Figure 2. Power function equations for these plus the remaining elements are documented with their corresponding coefficients of determination in Table 4. In these and the other similar expected trends, the maximum points of curvature of the fitted power functions can be taken as indicating "critical" elemental concentrations (as measured by the collective of methods employed) that correspond to the approximate point when relatively stable %CVs separate from rapidly increasing % CVs as concentrations decrease. For the two examples in Figure 2, the "critical" elemental concentrations are around 0.02% Na and 0.18% Cl.

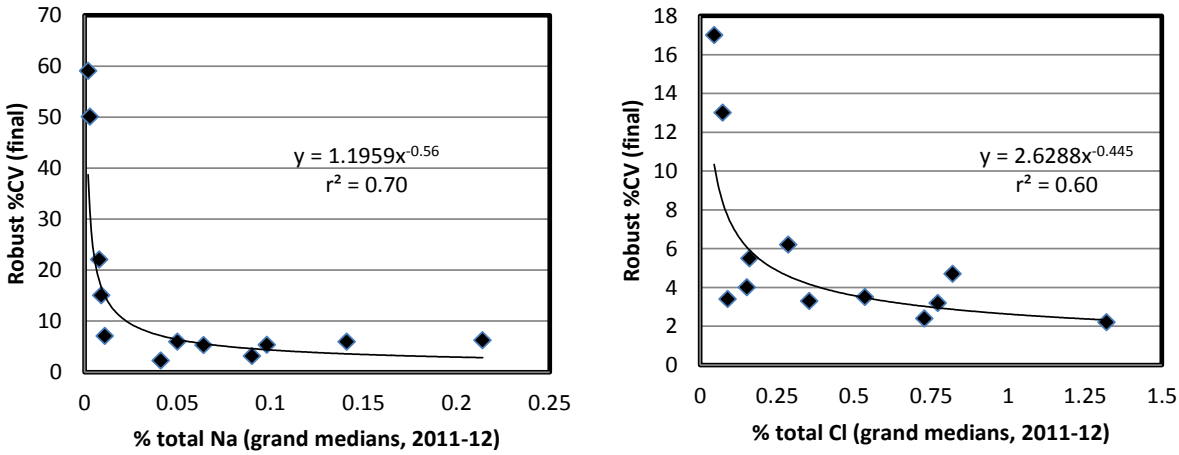

Figure 2. Two examples of highly significant continuous trends (power functions) between total plant concentrations (Na and Cl) and final robust % CVs (n=12).

Finally, grand median robust %CVs across all plant tests (nitrate-N excluded) ranged from 4.2% (ASP 22) to 8.7% (ASP 24), with a grand median for the 12 samples of 5.5%, a lower grand median than occurred for samples used in the 2010-11 program. The sequence for the sample with the lowest grand median %CV (final) to the highest grand median %CV (final) was 22, 101, 43, 104, 23, 41, 103, 21, 102, 42, 44 and 24 (all samples with the prefix ASP).

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11 Horwitz, W. (1982a). Evaluation of analytical methods used for regulation. *Journal of the Association of Official Analytical Chemists* **65**: 525-530.

12 Horwitz, W. (1982b). The problems of utilizing trace analysis in regulatory analytical chemistry. *Chemistry in Australia* **49**: 56-63.

13 Rayment, G.E. (2005). Statistical aspects of soil and plant test measurement and calibration in Australia. *Communications in Soil Science and Plant Analysis* **36** (1-3): 107-120.

Table 4. Power function equations and coefficients of determination for continuous relations between total plant concentrations (x) and final %CVs after removal of "outliers" and "stragglers" (y) for 12 test samples in ASPACs 2011-12 plant ILPP. *{Concentration units are as listed in Section 3.}*

Element	Power function: Y = Robust %CV and X = concentration	r^2		Element	Power function: Y = Robust %CV and X = concentration	r^2
Aluminium	$y = 38.489x^{-0.262}$	0.26		Manganese	$y = 3.0953x^{0.1215}$	0.24
Boron	$y = 22.837x^{-0.395}$	0.40		Molybdenum	$y = 6.3413x^{-0.406}$	0.54
Cadmium	$y = 1.0945x^{-0.716}$	0.52		Nitrogen	$y = 6.0167x^{-0.403}$	0.24
Calcium	$y = 4.0448x^{-0.124}$	0.10		Phosphorus	$y = 4.4112x^{-0.012}$	0.001
Carbon	$y = 3E+08x^{-4.931}$	0.30		Potassium	$y = 4.733x^{-0.055}$	0.02
Chloride	$y = 2.6288x^{-0.445}$	0.60		Selenium	$y = 2.3695x^{-0.737}$	0.58
Cobalt	$y = 13.581x^{-0.023}$	0.001		Silicon	$y = 8.9892x^{-0.496}$	0.27
Copper	$y = 2.8306x^{0.3884}$	0.06		Sodium	$y = 1.1959x^{-0.56}$	0.70
Iron	$y = 11.672x^{-0.141}$	0.05		Sulphur	$y = 3.2498x^{-0.21}$	0.31
Lead	$y = 1.9964x^{-0.858}$	0.47		Zinc	$y = 4.7818x^{-0.013}$	0.001
Magnesium	$y = 6.5124x^{0.1805}$	0.13				

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Appendix 1: List of laboratories (including contact details at the time) who participated in ASPAC's Plant ILPP in 2011-12, arranged by country

Name (positon)	*Facility*	*Street and/or Postal Address*	*Country*	*Email*
Luzmila Abercrombie (Laboratory Manager)	Sydney Environmental & Soil Laboratory	PO Box 357, Pennant Hills, NSW 1715	AUSTRALIA	luzmila@sesl.com.au
Ms Rabeya Akter (Senior Technical Officer)	Mark Wainwright Analytical Centre, The University of New South Wales	ICP - Elemental Analysis Lab, SSEAU, Sydney, NSW 2052	AUSTRALIA	r.akter@unsw.edu.au
Mr Phil Barnett (Manager)	Australian Perry Agricultural Laboratory	PO Box 327, Magill, SA 5072	AUSTRALIA	phil@apal.com.au
Mr Steve Byrne (Laboratory Manager)	Vintessential Laboratories	PO Box 2244, Dromana, VIC 3936	AUSTRALIA	steve@vintessential.com.au
Mrs Stephanie Cameron (Laboratory Operations Manager)	East West EnviroAg	82 Plain Street, Tamworth, NSW 2340	AUSTRALIA	admin@ewenviroag.com.au
Mr Rob Cirocco (Manager)	Phosyn Analytical	PO Box 2594, Burleigh MDC, QLD 4220	AUSTRALIA	rcirocco@phosyn.com
Miss Tania Collins (Lab Technician)	Tweed Laboratory Centre, Tweed Shire Council	46 Enterprise Avenue, Tweed Heads South, NSW 2486	AUSTRALIA	taniac@tweedlab.com.au
Mr George Croatto	Department of Primary Industries, Werribee Centre	621 Sneydes Rd, Werribee, VIC 3030	AUSTRALIA	george.croatto@dpi.vic.gov.au
Mr Rob DeHayr (Manager)	Dept. of Envi. & Resource Management – Chemistry Centre	Block A - Level 3, 41 Boggo Road, Joe Baker Street, Loading Dock 3, Dutton Park, QLD 4068	AUSTRALIA	rob.dehayr@derm.qld.gov.au Rob.Dehayr@science.dsitia.qld.gov.au
Ms Sarah Houston (Laboratory Manager)	Nutri-Lab Pty Ltd	PO Box 782, Goondiwindi, QLD 4390	AUSTRALIA	nutrilab@bigpond.net.au
Mr Paul Kennerly (Laboratory Manager)	Nutrient Advantage Laboratory Services	8 South Road, Werribee, VIC 3030	AUSTRALIA	paul.kennelly@incitecpivot.com.au
Mr Graham Lancaster (Laboratory Manager)	Environmental Analysis Laboratory (EAL)	Southern Cross University, PO Box 5125, East Lismore, NSW 2480	AUSTRALIA	glancast@scu.edu.au
Mr Robert Lascelles (Chief Chemist)	SGS Australia (QLD)	PO Box 549, Toowoomba, QLD 4350	AUSTRALIA	robert.lascelles@sgs.com
Mr Matthew Lee (Laboratory Manager)	Melbourne School of Land and Environment, Uni. of Melbourne	Water Street, Creswick, VIC 3363	AUSTRALIA	mattlee@unimelb.edu.au
Mr Stephen Ludvig (Advisor)	Agrilab	35 Wattlepark Avenue, Moolap, Victoria 3220	AUSTRALIA	aglab@agmin.com.au
Mr Peter McCafferty (Chief Chemist)	Chemistry Centre, Curtin University	PO Box 1250, Bentley Delivery Centre, WA 6983	AUSTRALIA	pmccafferty@chemcentre.wa.gov.au

Name (positon)	Facility	Street and/or Postal Address	Country	Email
Mr Ted Mikhail (Managing Director)	SWEP Pty Ltd Analytical Laboratories	PO Box 583, Noble Park, VIC 3174	AUSTRALIA	services@swep.com.au
Ms Zofia Ostatek-Boczynski (Senior Res. Officer)	BSES Limited	50 Meiers Road, Indooroopilly, QLD 4068	AUSTRALIA	zostatek-boczynski@bses.org.au
Mr Lyndon Palmer (Analytical Chemist)	Waite Analytical Services, School of Agriculture, Food and Wine	University of Adelaide Private Mail Bag 1, Glen Osmond, SA 5064	AUSTRALIA	lyndon.palmer@adelaide.edu.au
Mr Graeme Patch (Senior Chemist)	Department of Resources, Berrimah Agricultural Research Centre	GPO Box 3000, Darwin, NT 0801	AUSTRALIA	graeme.patch@nt.gov.au
Ms Nell Peisley (Laboratory Manager)	CSIRO Division of Plant Industry	GPO Box 1600, Canberra, ACT 2601	AUSTRALIA	nell.peisley@csiro.au
Dr Geof Proudfoot (Laboratory Manager)	CSBP	2 Altona St, Bibra Lake WA 6163	AUSTRALIA	geof.proudfoot@csbp.com.au
Mr Gary Prove (Supervising Technical Officer)	QHFSS - Organics - Environmental Waters Lab, , Forensic and Scientific Services	Queensland Health 39 Kessels Road, Coopers Plains, QLD 4108	AUSTRALIA	gary_prove@health.qld.gov.au
Mr Glen Rangott (Chemist)	Industry & Investment NSW - Wollongbar	1243 Brunxner Hwy, Wollongbar, NSW 2477	AUSTRALIA	glen.rangott@industry.nsw.gov.au
Mr Devarajan Shanmuganathan (Chemist)	Aglab Services	32 Wattlepark Avenue, Moolap, Victoria 3220	AUSTRALIA	aglab@admin.com.au
Mr Michael Smirk (Analytical Chemist)	School of Earth and Environment, University of WA.	35 Stirling Highway, Crawley, WA 6009	AUSTRALIA	michael.smirk@uwa.edu.au
Ms Julie Smith (Manager, Analytical Services)	CSIRO Land and Water, Adelaide	Private Bag 2, Glen Osmond, SA 5064	AUSTRALIA	julie.smith@csiro.au
Kellie Taylor (Laboratory Manager)	EP Analysis	PO Box 400, Cummins, SA 5631	AUSTRALIA	info@epanalysis.com.au
Prema Naidu (Laboratory Technician)	Sugar Research Institute of Fiji, Analytical Lab	PO Box 3560, Lautoka	FIJI	premn@srif.org.fj
Ami Sharma (Senior Research Officer)	Fiji Agricultural Chemistry Laboratory, MASLR	PO Box 77, Nausori	FIJI	ami.sharma@govnet.gov.fj
Mrs Maxie Christison (Laboratory Manager)	City Water & Waste Laboratory, ChristChurch City Council	POBox 73041, Christchurch 8154	NEW ZEALAND	maxie.christison@ccc.govt.nz
Mr Gary Glenn (Quality Manager)	Analytical Research Laboratories Ltd	PO Box 989, Napier	NEW ZEALAND	gary.glenn@ravensdown.co.nz
Wendy Homewood (QA Officer Ag Division)	Hill Laboratories	Private Bag 3205, Hamilton 3240	NEW ZEALAND	wendy.homewood@hill-labs.co.nz
Mr Gareth Salt (Laboratory Managter)	Landcare Research NZ Ltd	Private Bag 11052, Palmerston North	NEW ZEALAND	saltg@landcareresearch.co.nz

Name (positon)	***Facility***	***Street and/or Postal Address***	***Country***	***Email***
Diana Unsworth (Laboratory Analyst)	Veritec	Private Bag 3020, Rotorua	NEW ZEALAND	Diana.Unsworth@scionresearch.com
Mr Peter Corbett	National Agricultural Chemistry Laboratory, NARI	PO Box 8277, BOROKO 111 [National Capital District]	PAPUA NEW GUINEA	peter.corbett@nari.org.pg
Tata Telawika	Unitech Analytical Services Laboratory, Department of Agriculture, Papua New Guinea University of Technology	Private Mail Bag LAE Morobe Province 411	PAPUA NEW GUINEA	ttelawika@ag.unitech.ac.pg
Mr Daya Perera (Senior Technician)	School of Agriculture & Food Technology	Alafua Campus, The University of the South Pacific	SAMOA	perera_d@samoa.usp.ac.fj

Appendix 2: Homogeneity data and statistical assessments* for Total Plant N% (Dumas N) on the 12 test plant samples in 2011-12.

Sample name		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
Sub-sample													
1	Rep 1	4.22	1.63	0.93	3.90	2.49	1.09	1.91	1.89	4.83	2.84	3.47	2.74
	Rep 2	4.26	1.62	0.92	3.95	2.45	1.09	1.89	1.85	4.85	2.86	3.40	2.79
2	Rep 1	4.38	1.49	0.88	3.93	2.48	1.10	1.89	1.89	4.88	2.91	3.38	2.72
	Rep 2	4.30	1.52	0.94	3.93	2.40	1.08	1.94	1.90	4.9	2.91	3.40	2.69
3	Rep 1	4.36	1.49	0.87	4.02	2.50	1.10	1.90	1.88	4.9	2.92	3.47	2.7
	Rep 2	4.31	1.52	0.96	3.97	2.41	1.10	1.89	1.87	4.86	2.92	3.41	2.78
4	Rep 1	4.31	1.51	0.89	3.92	2.46	1.10	1.92	1.83	4.89	2.86	3.35	2.65
	Rep 2	4.26	1.50	0.99	3.88	2.41	1.11	1.90	1.85	4.82	2.89	3.42	2.74
5	Rep 1	4.34	1.51	0.89	3.96	2.50	1.13	1.90	1.90	4.87	2.94	3.43	2.73
	Rep 2	4.27	1.54	0.99	3.94	2.41	1.08	1.90	1.80	4.80	2.97	3.43	2.7
6	Rep 1	4.34	1.52	0.86	3.98	2.47	1.1	1.93	1.83	4.89	2.9	3.36	2.72
	Rep 2	4.28	1.55	0.96	3.94	2.40	1.12	1.91	1.90	4.92	2.94	3.41	2.78
7	Rep 1	4.35	1.53	0.87	3.95	2.49	1.09	1.91	1.85	4.83	2.85	3.38	2.68
	Rep 2	4.29	1.56	1.01	3.96	2.38	1.12	1.90	1.87	4.88	2.91	3.50	2.77
8	Rep 1	4.33	1.50	0.90	3.95	2.48	1.09	1.93	1.84	4.88	2.89	3.30	2.71
	Rep 2	4.28	1.53	0.97	3.97	2.39	1.09	1.91	1.86	4.86	2.85	3.38	2.75
9	Rep 1	4.28	1.54	0.91	3.97	2.39	1.10	1.92	1.83	4.89	2.90	3.43	2.77
	Rep 2	4.27	1.52	0.90	3.96	2.47	1.10	1.90	1.83	4.86	2.9	3.41	2.8
10	Rep 1	4.29	1.55	0.90	3.90	2.5	1.14	1.90	1.87	4.9	2.9	3.32	2.76
	Rep 2	4.31	1.54	0.94	3.99	2.41	1.14	1.90	1.88	4.84	2.91	3.48	2.77

Mean	**4.30**	**1.54**	**0.92**	**3.95**	**2.44**	**1.10**	**1.91**	**1.86**	**4.87**	**2.90**	**3.41**	**2.74**
Analytical SD	0.001	0.0004	0.004	0.001	0.003	0.0002	0.0002	0.001	0.001	0.0005	0.003	0.002
Sampling SD	0.0002	0.001	0	0.0002	0	0.0001	0	0	0	0.0007	0	0.00001
SD proficiency data	0.193	0.070	0.089	0.171	0.074	0.089	0.052	0.0741	0.259	0.089	0.104	0.059
Homogeneity index*	0.071	****0.459**	0	0.088	0	0.127	0	0	0	****0.301**	0	0.045
Status	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**

* Homogeneity statistics calculated according to:- Thompson, M., Ellison, S.L.R. and Wood, R. (2006). "The International Harmonised Protocol for the Proficiency Testing of Analytical Chemistry Laboratories." *Pure Appl. Chem.* **78** (1): 145-196. IUPAC Tech. Report..

** Although the homogeneity Index is >0.3, the critical value for test (c) is less than the sampling variance.

Appendix 3: Statistical procedures used by ASPAC for its contemporary plant ILPP

Refer to Table 3 for a description of most statistical terms and their meaning. Of most significance is the "median / MAD" non-parametric, iterative procedure for identifying "outliers" (††) and "stragglers" (†) within datasets for particular tests and samples from multiple (typically 6 or greater) laboratories. See references in the body of the report for more details. Also, the median (μ) is regarded as a good estimate of the true mean, while the MAD; ie. the median of the absolute deviations from the median, @), is regarded as a good estimate of the standard deviation.

After tabulating the data with a separate column for each sample result and a separate row for each laboratory, calculations were applied iteratively. Each iteration operated at an action level of [(X- μ)/f@] (called the "ASPAC Score" for convenience) > 2, where "X" is the value reported by the laboratory (one replicate assumed), "μ" is the median of the population of values, and "f@" is a code for the Gaussian distribution of the sample size "n", approximated by [0.7722 + 1.604/n * t, with t = the Student's "t" for 5% (two-tailed) with n-1 degrees of freedom]. Excluding any case when a laboratory reported no result (or a non-numeric value) [these were automatically excluded], the laboratories at first iteration with an "ASPAC score" > 2 were rated as "outliers" (††). Following their removal (if any), the remaining population of laboratory data were subject to a second iteration involving a recalculation of the "ASPAC score". When again >2, the relevant laboratories were rated as "stragglers" (†).

The other statistics summarised in Table 3 were calculated on the same populations of data. Only the first (1) and second (final; f) values appear in the data summaries in Section 3.

Appendix 4: Plant analytical method codes and "Raw" program data for the 12 plant samples across three "rounds" in 2011-12.

The following tabulations of "raw" plant analytical data, as reported by participating laboratories, are listed in approximate alphabetical order by element after removal of unnecessary precision, this following completion of statistical tests. Precision adjustments were performed only to assist "raw" data presentation. Statistical "outliers" and "stragglers" are indicated by †† and †, respectively. All results are understood to be on an oven dry basis. Method Codes listed in the "raw data" tabulations are described in Tables 5 and 6.

Table 5. ASPAC method indicating codes (MIC) to allow laboratories to record the preparation, extraction and/or digestion techniques used for each plant test / element reported in this ILPP. A separate ASPAC Code (see Table 6) is required to identify relevant instrumental and/or analytical finishes.

Preparation / Extraction / Digestion Technique	ASPAC MIC Code
Dry Ashing with HF, and uptake in HCl	AA
Dry Ashing with HF, and uptake in HNO_3	AB
Dry Ashing with HF, and uptake in H_2SO_4	AC
Dry Ashing without HF, and uptake in HCl	AD
Dry Ashing without HF, and uptake in HNO_3	AE
Dry Ashing without HF, and uptake in H_2SO_4	AF
Extraction with acid(s)	BA
Extraction with water	BB
Finely-divided dry sample	CA
Microwave digestion - closed system with HF, and final medium H_2SO_4	DA
Microwave digestion - closed system with HF, and final medium HNO_3 and/or HCl	DB
Microwave digestion - closed system with HF, and final medium $HClO_4$	DC
Microwave digestion - closed system without HF, and final medium H_2SO_4	DD
Microwave digestion - closed system without HF, and final medium HNO_3 and/or HCl	DE
Microwave digestion - closed system without HF, and final medium HCIO4	DF
Microwave digestion - open system with HF, and final medium H_2SO_4	DG
Microwave digestion - open system with HF, and final medium HNO_3 and/or HCl	DH
Microwave digestion in open system with HF, and final medium $HClO_4$	DI
Microwave digestion - open system with HF, and final medium HNO_3 / peroxide	DJ
Microwave digestion - open system without HF, and final medium H_2SO_4	DK
Microwave digestion - open system without HF, and final medium HNO_3 and /or HCl	DL
Microwave digestion - open system without HF, and final medium $HClO_4$	DM
Microwave digestion - open system without HF, and final medium HNO_3 / peroxide	DN
Pellet (fused)	EA
Pellet (pressed powder)	EB
Schoeniger combustion with Pt and O_2, with uptake in HCl	FA
Schoeniger combustion with Pt and O_2, with uptake in HNO_3	FB
Wet digestion - open system with HF, and final medium H_2SO_4	GA

Preparation / Extraction / Digestion Technique	ASPAC MIC Code
Wet digestion - open system with HF, and final medium HNO_3 and /or HCl	GB
Wet digestion - open system with HF, and final medium $HClO_4$	GC
Wet digestion - open system with HF, and final medium HNO_3 / peroxide	GD
Wet digestion - open system without HF, and final medium H_2SO_4 (includes Kjeldahl – not quantitative for NO_3)	GE
Wet digestion - open system without HF, and final medium H_2SO_4 (includes Kjeldahl – quantitative for NO_3)	GF
Wet digestion - open system without HF, and final medium HNO_3 and /or HCl	GG
Wet digestion - open system without HF, and final medium $HClO_4$	GH
Wet digestion - open system without HF, and final medium HNO_3 / peroxide	GI
Wet digestion - open system without HF —diacid (HNO_3 , $HClO_4$)	GJ
Wet digestion - open system without HF — triacid (HNO_3 , H_2SO_4, $HClO_4$)	GK
Others	ZZ

Table 6. ASPAC's method indicating codes for instrumental and/or analytical finishes (IA-MIC) to allow laboratories to record the instrumental and/or analytical finishes associated with each plant test / element reported in this ILPP. A separate ASPAC Code (see Table 5) is required to identify relevant preparation/extraction/digestion techniques.

Instrumental and/or analytical finish	ASPAC IA-MIC Code
AAS-ETA: [Atomic Absorption Spectrophotometry Electro-Thermal Atomisation] background correction, without chemical modifier	01
AAS-ETA with deuterium background correction, without chemical modifier	02
AAS-ETA with Zeeman background correction, without chemical modifier	03
AAS-ETA with pulsed hollow cathode lamp background correction, without chemical modifier	04
AAS-ETA without background correction, with chemical modifier	05
AAS-ETA with deuterium background correction, with chemical modifier	06
AAS-ETA with Zeeman background correction, with chemical modifier	07
AAS-ETA with pulsed hollow cathode lamp background correction, with chemical modifier	08
AAS-Flame, without background correction, using air-acetylene	09
ASS – carbon rod –graphite furnace	10
AAS-Flame with deuterium background correction, using air-acetylene	11
AAS-Flame with Zeeman background correction, using air-acetylene	12
AAS-Flame with pulsed hollow cathode lamp background correction, using air-acetylene	13
AAS-Flame without background correction, using N_20-acetylene	14
AAS-Flame with deuterium background correction, using N_20-acetylene	15
AAS-Flame with Zeeman background correction, using N_20-acetylene	16
AAS-Flame with pulsed hollow cathode lamp background correction, using N_20-acetylene	17
Chromatography	18
Cold vapour technology	19

Instrumental and/or analytical finish	ASPAC IA-MIC Code
Flame emission	20
Gravimetric	21
Hydride technology and similar	22
ICP-AES	23
ICP-MS	24
Infrared — near-range (NIR)	25
Infrared — mid-range (MIR)	26
Ion selective electrode	27
Ion chromatography	28
Neutron activation analysis	29
Spectrophotometry (manual)	30
Spectrophotometry (auto; segmented flow, FIA, DA, etc)	31
Titrimetric	32
Turbidimetric / or Nephelometric	33
Voltammetry (direct)	34
Voltammetry (stripping)	35
X-ray fluorescence	36
Dumas (eg. Leco)	37
Others (specify)	38

Lab. Code #	Method Codes	Plant sample identification and values for 2011-12 Aluminium (mg Al/kg)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L005	GI-23	11.9	124	303	123								
L008	DE-23	9.01	115	600 †	145	130	75.4	355	10.7 †	289	172	337 †	62.8
L009	GJ-23	8.59	87.2 †	327	132	90.8 †	74.4	363	28.6 †	276	140	243	65.5
L011	GJ-23	33.6 †	123	318	144	114	73.4	371	21	261	121	247	51.1
L013	DN-23	10.7	135	340	141	131	84.6	408	22.2	276	144	250	54.2
L016	GJ-23	7.23	126	400	137	124	81.1	408	21.5	269	170	246	49.8
L018	GJ-23	6.88	144	410	168 †								
L019	AE-24	12.6	122	212	121	118	83.4	349	24.6	260	147	232	62
L022	DE-23	8.3	133	354	130	138	79	396	25	264	149	249	50
L023	DN-23	9.69	124	423	129	121	75.9	387	21.9	241	151	256	54.6
L026	GI-23	11.4	142	306	146	124	87.2	431	25.3	269	135	262	56.3
L028	DE-23	11.5	139	467	168 †	148	85.3	419	21.8	289	176	281	61
L030	GJ-23					125	66.4	344	20.3				
L032	GG-23	7.53	101 †	169	104 †	87.6 †	60.4	316	13.9 †	223 †	103 †	193 †	42.7
L036	DE-23	7.15	130	386	156	124	84.8	393	22.8	289	154	260	79.6 †
L040	DE-23	8.12	119	303	133	109	77.8	383	20.4	267	151	250	53.9
L079	GJ-23	11	148	432	137	113	69	364	15	259	139	226	53.4
L097	DE-23	20.6 †	137	339	164	130	78.2	381	21.4	274	165	316 †	68.7
L133	GG-23	8.86	116	252	128	101	62.7	335	19.2				
L135	DN-23	20.7 †	130	300	159	123	64.4	394	13.9 †	255	156	242	67
L139	AD-23	7.05	137	364	155	108	59.6	417	12.4 †	251	109	224	50.2
L156	GI-24	5.04	142	217	133	115	78.7	437	17.6	353 †	177	320 †	69.8
L165	GG-23	5.95	92.6 †	137 †	96.6 †	140	93	500 †	46 †	208 †	88.7 †	209 †	36.9
L178	DE-23	7.48	113	297	129	112	78.4	380	21.1	269	148	253	54.8
L179	GH-23	76 †	309 †	654 †	239 †	233 †	139 †	417	62.1 †	336 †	227 †	279	69.2
L180	ZZ-38									341 †	187	293 †	79.9 †

Lab. Code #	Method Codes	Plant sample identification and values for 2011-12: Boron (mg B/kg)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L005	GI-23	0.705 †	47.3 †	29.7 †	35.9								
L008	DE-23	6.23	185	25.2	34.8	23.7	1.17 †	9.83 †	0.177	21.3 †	26.6	27.3	20.4
L009	DE-23	6.39	153 †	22.9	31.2	24.3	3.12	11.6	2.46	22.5	27.4	26.8	21.5
L011	GJ-23	6.61	174	25.9	32.4	25.6	3.6	11.4	1.28	22.5	28.4	27.9	20.8
L013	DN-23	6.38	193	24.9	32.6	23.2	2.76	10.4	1.07	22.3	28.3	27.6	21.7
L015	AD-23	7.88 †	194	25.1	33.6	25.9	3.35	11.8	0.86	23.7	29.7	29.4	23.3
L016	GI-23	6.34	192	23.2	32.6	26.5	2.5	12.3	0.874	24	31	30.6	24.2
L018	GJ-23	6.04	180	23	33.1	24.9	2.74	11.5	1.14	23.4	27.7	27.7	21.4
L019	AE-24	1.54 †	205	22.4	31	25.6	3.87	12.1	1.77	22.7	31.5	29.9	22.8
L022	DE-23	6.4	195	23.2	32.1	25.9	3	11.5	0.98	23.2	31.3	28.9	25.5
L023	DN-23	6.53	180	22.7	32.4	24.6	4.45	12.2	2.47	20.6 †	27.2	25.9	19.4
L026	GI-23	6.85	202	24	32.9	25.6	3.21	11.9	1.49	23.7	31.1	30	25.2
L028	DE-23	6.4	193	24.4	34.1	27.1	2.64	12	1.04	23.4	29.7	28.4	21.4
L030	GJ-23					22.2	3.77	10.9	1.97				
L032	GG-23	7.5 †	182	22.8	31.8	24.2	3.28	11.3	1.77	21.7	27.9	26.1	23.1
L034	GC-23					25.1	2.22	11.5	0.552	22.5	28.2	28.2	21.3
L036	DE-23	7.13 †	188	25.1	34.6	26.6	3.01	11.3	0.484	22.4	26.5	27.3	20.8
L040	DE-23	6.23	208	23.8	32.7	25	3.24	11.3	0.71	23.2	30.7	29.5	23.8
L045	GI-23	8.28 †	142 †	23.8	31.4	22.5	3.26	10.7	1.78	22.6	28.1	27.1	21.8
L064	GJ-30	6.4	105 †	22.8	30.8	12.9 †	4.61 †	11.5	8.57 †	24.1	24.2	27.5	23.8
L080	GJ-30	9.3 †	115 †	20.4 †	26.4 †	18.4 †	8.98 †	12.5	5.46 †	22.9	26.4	27.3	21.4
L097	DE-23	6.51	193	24.2	34.3	24.8	1.78	11.7	0.347	24.4	31	30.9	23.5
L133	GG-23	3.89 †	183	21.7	26.8 †	23.7	2.66	10.8	1.18				
L135	DN-23	6.81	192	25.6	34.3	26.5	2.42	12.1	0.82	19.3 †	28.8	26.7	21.5
L139	AD-23	6.19	200	24.4	33.3	28	2.79	12.6	0.533	23.6	31.3	29.9	23.7
L156	GI-24	7.58 †	199	24.7	35.1	29.5 †	3.99	13.9 †	2.87 †	33.1 †	44.7 †	42.6 †	32.1 †
L164	GJ-30	10.7 †	138 †	18.4 †	20.6 †								
L165	GG-23	5.05 †	193	22.9	30.4	24	1 †	10 †		23.3	28.9	29.6	22.8
L178	DE-23	6.41	211	23.5	32	25.5	3.17	11.2	0.68	23.1	31.3	29.9	24.2
L179	GH-23	6.6	134 †	22.9	33.3	23.6	3.16	11.3	1.51	23.4	26.6	26.7	18.5

Lab. Code #	Method Codes	Plant sample identification and values for 2011-12: Cadmium (mg Cd/kg)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L008	DE-24	0.019	0.00	0.04	0.173	0.176	0.073 †	0.074	0.007 †	0.054	0.033	0.064	0.013
L009	GJ-23	0.013	0.00	0.04	0.162	0.213	0.084	0.082	0.016	0.052	0.036	0.062	0.02
L011	DE-23	0.015	0.00	0.04	0.13 †	0.182	0.084	0.08	0.032 †	0.047	0.033	0.052 †	0.035 †
L013	DN-23	0.023	0.00	0.04	0.174	0.205	0.084	0.08	0.016	0.05	0.027	0.06	0.015
L016	GJ-24	0.005	0.00	0.04	0.171	0.22	0.089 †	0.086	0.018	0.051	0.028	0.062	0.015
L019	AE-24	0.06 †	0.00	0.05 †	0.186	0.204	0.084	0.078	0.017	0.059 †	0.024	0.064	0.019
L022	DE-24	0.01	0.00	0.04	0.181	0.22	0.085	0.084	0.012	0.05	0.029	0.061	0.016
L023	DN-24	0.019	0.00	0.04	0.181	0.204	0.085	0.083	0.015	0.052	0.029	0.063	0.015
L028	DE-24	0.004	0.00	0.04	0.173	0.246	0.103 †	0.099 †	0.017	0.052	0.032	0.059	0.016
L032	GG-24	0.011	0.00	0.04	0.151	0.203	0.081	0.078	0.019	0.045	0.027	0.056 †	0.016
L040	DE-24	0.01	0.00	0.03	0.165	0.243	0.082	0.084	0.026 †	0.049	0.048 †	0.064	0.022
L079	GJ-23	0.001	0.00	0.01 †	0.081 †	0.138 †	0.046 †	0.06 †	0.001 †				
L133	GG-02	0.887 †	0.00	0.01 †	0.153	0.314 †	0.336 †	0.294 †	0.063 †				
L178	DE-24	0.01	0.00	0.04	0.158	0.246	0.083	0.084	0.026 †	0.05	0.047 †	0.069 †	0.021

Lab. Code #	Method Codes	Plant sample identification and values for 2011-12: Calcium (%Ca)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L002	AD-09									0.651	0.592 †	1.25	0.857
L005	GI-23	0.073 †	1.36	1.33	3.39 †								
L007	AD-09	0.083	1.36	1.3	3.13 †	0.78 †	0.24 †	0.33 †	0.073	0.674	0.924 †	0.714 †	1.34 †
L008	DE-23	0.08	1.41	1.35	3.73	0.989	0.276	0.402	0.034 †	0.675	0.734	1.36	1.05 †
L009	GJ-23	0.083	1.43	1.35	3.71	1.07	0.269	0.412	0.075	0.67	0.701	1.29	0.939
L011	GJ-23	0.081	1.45	1.34	3.77	1.08	0.252	0.384	0.072	0.644	0.637 †	1.24	0.891
L012	GE-11	0.128 †	1.13 †	1.25	2.29 †	3.76 †	2.24 †	2.36 †	1.69 †	2.53 †	1.73 †	4.98 †	4.83 †
L013	DN-23	0.084	1.46	1.33	3.65	1.02	0.293	0.43	0.075	0.69 †	0.707	1.26	0.901
L015	GJ-23	0.079	1.47	1.41	3.7	1.05	0.3	0.431	0.069	0.71 †	0.768	1.36	0.976
L016	GI-23	0.081	1.4	1.33	3.48	1.02	0.285	0.43	0.069	0.651	0.722	1.26	0.924
L018	GJ-23	0.082	1.54	1.44	3.72	1.04	0.278	0.436	0.068	0.665	0.712	1.28	0.906
L019	AE-24	0.078	1.39	1.31	3.62	1	0.291	0.411	0.067	0.691 †	0.779	1.39	0.969
L022	DE-23	0.08	1.49	1.37	3.63	0.985	0.279	0.418	0.068	0.654	0.768	1.3	0.99
L023	DN-23	0.081	1.48	1.39	3.73	1.03	0.276	0.429	0.063	0.65	0.742	1.27	0.927
L026	GI-23	0.076	1.42	1.26	3.43 †	1.01	0.276	0.414	0.064	0.635	0.717	1.31	0.985
L028	DE-23	0.09 †	1.51	1.42	3.77	1.1	0.28	0.43	0.07	0.685 †	0.74	1.3	0.92
L030	GJ-23					0.972	0.254	0.389	0.065				
L032	GG-23	0.076	1.4	1.3	2.33 †	0.912 †	0.249	0.37	0.062	0.56 †	0.645 †	1.1 †	0.853
L034	GC-23					0.927	0.259	0.386	0.056	0.654	0.669	1.25	0.855
L036	DE-23	0.085	1.49	1.44	3.88	1.03	0.267	0.418	0.068	0.685 †	0.708	1.28	0.959
L040	DE-23	0.082	1.55	1.35	3.72	1.02	0.279	0.412	0.063	0.65	0.72	1.33	0.92
L042	GF-14	0.071 †	1.5	1.43	3.48	1.03	0.31 †	0.46	0.07	0.68	0.78	1.29	0.88
L045	GI-23	0.08	1.42	1.47	3.64	0.962	0.265	0.393	0.064	0.652	0.754	1.31	0.965
L064	GJ-11	0.081	1.45	1.42	3.83	0.995	0.275	0.417	0.075	0.646	0.792	1.39	1.08 †
L079	GJ-23	0.081	1.49	1.3	4.29 †	0.994	0.266	0.39	0.067	0.767 †	0.756	1.34	0.962
L080	GJ-13	0.038 †	1.77 †	1.74 †	3.61	1.14 †	0.22 †	0.398	0.037 †	0.366 †	0.47 †	1.29	1.1 †
L097	DE-23	0.95 †	1.44	1.35	3.69	0.96	0.253	0.391	0.063	0.658	0.744	1.35	0.967
L133	GG-23	0.076	1.39	1.37	3.68	0.868 †	0.229 †	0.355 †	0.052 †				
L135	DN-23	0.098 †	1.33	1.57 †	4.05 †	1.004	0.263	0.433	0.073	0.65	0.85 †	1.37	1.06 †
L139	AD-23	0.087	1.3	1.24	3.56	1.07	0.265	0.416	0.072	0.662	0.735	1.27	0.965
L142	GJ-13					0.871 †	0.224 †	0.323 †	0.044 †				
L156	GI-23					1.04	0.274	0.433	0.072	0.923 †	1.08 †	1.98 †	1.4 †
L164	GJ-11	0.085	1.52	1.42	3.66	0.974	0.282	0.425	0.083 †	0.63	0.718	1.23	0.936
L165	GG-23	0.078	0.14 †	0.13 †	3.55	0.81 †	0.28	0.54 †	0.09 †			1.4	
L178	DE-23	0.083	1.49	1.39	3.91 †	1.05	0.283	0.405	0.065	0.653	0.73	1.37	0.94
L179	GH-23	0.09 †	1.37	1.39	3.69	0.922	0.258	0.383	0.063	0.739 †	0.676	1.11 †	0.777 †
L180	ZZ-38									0.647	0.861 †	1.12 †	0.204 †

Lab. Code #	Method Codes	Plant sample identification and values for 2011-12: Carbon (%C)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L008	CA-37	42.6	43.5	39.4	38.2	43.8 †	42.3	46.5 †	40.9 †	43	48.5	43.5	50.4
L009	CA-37	42.9	43.7	40.5	39.5	46.2 †	43.8	49.5	43.3	42.8	48.5	43.2	51.7
L011	CA-21	51.6 †	48.1 †	47.1 †	40.2	49.7 †	50.2 †	46.6 †	51.6 †				
L013	CA-37	45.7	46.2	44	41.1	49.1 †	46	51.2 †	46.6	45.1 †	50.7 †	45.5 †	53.4 †
L015	CA-37	44.2	44.9	42.8	39.8	47.3	45	49.6	45.2	42.8	48.5	43.5	50.5
L018	CA-37	43.7	44.6	42.2	39.4	48	45	50	46	43.1	48.6	43.5	50.7
L019	CA-37	42.7	43.9	41.1	38.7	48	45.4	50	45	42.2	49.6	43	51.6
L022	CA-37	43.5	44.9	41.7	39.7	47.3	44.6	49.3	44.5	42.7	49.6	43.4	51.8
L023	CA-37	42	43.3	40.3	38.1	47.6	45	49.7	44.5	40.3 †	47.6 †	41.5 †	49.7
L028	CA-37	44.6	45.1	42.8	40.2	48.1	46.4	51.3 †	46.1	43.6	49	44	51.3
L030	CA-37					49.3 †	47.2	51.8 †	47.3				
L032	CA-37	41.1	42.6	39.7	37.7	45 †	42.7	47 †	42.4 †	39.7 †	46.9 †	40.9 †	48.9
L036	CA-37	44.2	45.1	42.2	40.3	47.5	44.9	49.9	45	42.9	47.9	41.4 †	48.8
L040	CA-37	43.1	43.7	42	39.5	47.3	45.1	48.9	45.2	42.3	48.8	43.5	50.7
L042	CA-37	43	44.3	42.2	39.5	47.7	45.5	49.4	45.5	42	48.1	42.5 †	49.8
L046	CA-37	41.6	41.7	39.4	36.8	45.5 †	43.2	47.8 †	42.8				
L079	CA-37	45.3	46.1	43	40.9	48.5	45.9	50.7	45.7	44.4 †	49.3	44.3	51.2
L097	CA-37	41.3	42.7	39.8	37.8	45.1 †	42.8	47.2 †	42.4 †	42.9	49	43.6	50.8
L156	CA-37	43.6	44.8	42.9	39.8	47.5	45.8	49.9	45.3	42.1	48.8	43.2	50.6
L165	CA-37	41.8	42.6	40.2	37.8	53 †	49 †	53 †	48 †	42.3	48.6	43.8	54.4
L178	CA-37	43.3	43.7	42	39.3	47.6	44.7	49.2	45	42.5	48.9	43.3	50.8

Lab. Code #	Method Codes	Plant sample identification and values for 2011-12: Chloride (%Cl)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L009	BB-32	0.089	0.29	1.33	0.834	0.092	0.774	0.158	0.1 †	0.374	0.19	0.733	0.552
L011	BB-31	0.063 †	0.33	1.63 †	0.78	0.087	0.822	0.155	0.01 †	0.401 †	0.354 †	0.782	0.522
L013	CA-27	0.095	0.28	1.36	0.84	0.075	0.76	0.145	0.045	0.36	0.16	0.73	0.54
L016	BA-23	0.092	0.28	1.34	0.826	0.073	0.79	0.149	0.044	0.344	0.163	0.728	0.523
L018	BA-32	0.084	0.28	1.32	0.81	0.106 †	0.785	0.154	0.049				
L019	BB-31	0.085	0.37 †	1.46 †	0.922 †	0.106 †	0.598 †	0.192 †	0.038	0.45 †	0.45 †	0.878 †	0.709 †
L022	BB-31	0.09	0.33	1.32	0.82	0.09	0.77	0.152	0.046	0.37	0.16	0.718	0.547
L023	BB-38	0.089	0.30	1.32	0.844	0.073	0.772	0.144	0.042	0.352	0.181	0.698	0.546
L026	BB-31	0.082 †	0.28	1.29	0.789	0.074	0.737	0.146	0.043	0.343	0.15	0.725	0.559
L028	BB-31	0.09	0.26	1.36	0.79	0.05 †	0.67 †	0.1 †	0.04	0.34	0.17	0.7	0.5
L030	BB-31					0.065	0.704 †	0.13 †	0.038				
L034	BA-32					0.086	0.774	0.152	0.051	0.359	0.171	0.736	0.536
L036	BB-31	0.088	0.34 †	1.4 †	0.899	0.081	0.765	0.151	0.037	0.404 †	0.262 †	0.775	0.572
L040	BB-32	0.09	0.28	1.32	0.803	0.072	0.778	0.152	0.052	0.352	0.161	0.713	0.515
L045	GI-23	0.052 †	0.26	1.51 †	0.821	0.143 †	0.669 †	0.19 †	0.055	0.332	0.316 †	0.644 †	0.483 †
L064	BB-27	0.101 †	0.28	1.25	0.872	0.103 †	0.792	0.16	0.096 †	0.357	0.171	0.736	0.542
L097	BA-32	0.092	0.27	1.26	0.786	0.073	0.717	0.141	0.046	0.357	0.135	0.73	0.534
L133	BB-18	0.105 †	0.29	1.57 †	0.988 †	0.08	0.895 †	0.161	0.047				
L135	BB-32	0.04 †	0.20 †	1.06 †	0.54 †	0.07	0.67 †	0.07 †	0.02 †	0.178 †	0.043 †	0.7	0.437 †
L139	BB-31	0.096	0.30	1.31	0.85	0.13 †	0.746	0.17 †	0.06	0.356	0.347 †	0.761	0.617 †
L164	BB-38	0.092	0.25	1.16 †	0.71 †	0.071	0.788	0.151	0.047	0.324	0.159	0.66 †	0.522
L178	BB-32	0.088	0.27	1.34	0.796	0.073	0.77	0.148	0.053	0.355	0.159	0.712	0.519
L179	BA-31	0.1 †	0.36 †	1.48 †	1 †	0.16 †	0.745	0.195 †	0.055	0.485 †	0.485 †	0.79 †	0.67 †

Lab. Code #	Method Codes	Plant sample identification and values for 2011-12: Cobalt (mg Co/kg)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L008	DE-24	0.03	0.06	0.15	0.14	0.086	0.045	0.085	0.151	0.21	0.181	0.194	0.004
L009	GJ-23	0.034	0.06	0.11	0.073	0.077	0.048	0.08	0.134	0.177	0.111	0.195	0.024
L011	GJ-23	0.085 †	0.06	0.17 †	0.071	0.116	0.047	0.095	0.125	0.125 †	0.159	0.151 †	0.044
L013	DN-23	0.04 †	0.07	0.11	0.118	0.087	0.16 †	0.082	0.232	0.178	0.159	0.191	0.029
L016	GJ-24	0.033	0.05	0.10	0.065	0.102	0.044	0.08	0.371	0.171	0.133	0.192	0.018
L019	AE-24	0.022 †	0.07	0.12	0.127	0.092	0.047	0.083	0.095	0.191	0.151	0.205	0.039
L022	DE-24	0.032	0.07	0.11	0.091	0.097	0.051	0.088	0.442	0.191	0.166	0.195	0.029
L023	DN-24	0.034	0.06	0.12	0.11	0.081	0.043	0.082	0.551	0.168	0.13	0.191	0.033
L026	GI-23	0.039	0.05	0.10	0.089	0.078	0.047	0.088	1.64 †	0.168	0.216	0.191	0.022
L028	DE-24	0.035	0.05	0.11	0.061	0.089	0.061 †	0.09	0.41	0.178	0.19	0.168 †	0.02
L032	GG-24	0.033	0.04	0.10	0.075	0.11	0.015 †	0.075	0.254	0.168	0.174	0.171 †	0.02
L040	DE-24	0.033	0.09	0.12	0.09	0.131 †	0.048	0.085	0.253	0.186	0.136	0.185	0.063 †
L079	GJ-23	0.03	0.01 †	0.14	0.11	0.072	0.047	0.099	0.156	0.82 †	1.05 †	0.06 †	0.77 †
L097	DE-24	0.034	0.05	0.10	0.048	0.073	0.039	0.077	0.554	0.199	0.132	0.19	0.021
L133	GG-23					0.062	0.041	0.096	0.299				
L135	DN-23	0.02 †	0.05	0.08	0.09	0.076	0.035 †	0.25 †	0.313	0.195	0.199	0.173 †	0.051
L139	AD-23	0.046 †	0.04	0.08	0.054	0.098	0.042	0.076	0.481	0.169	0.148	0.159 †	0.024
L178	DE-24	0.032	0.10	0.12	0.088	0.135 †	0.048	0.084	0.25	0.191	0.14	0.18	0.059 †
L179	GH-23	0.04 †	0.12 †	0.19 †	0.12	0.081	0.058	0.078	0.255	0.192	0.152	0.198	0.031

Lab. Code #	Method Codes	Plant sample identification and values for 2011-12: Copper (mg Cu/kg)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L002	AD-09									3.56	10.5	4.58 †	7.63
L005	GI-23	7.79	14	6.77	4.43 †								
L007	AD-13	8	16.4 †	12.6 †	8.55 †	11.5	7.5	6.1	0.2 †	8.95 †	16.4	27.3 †	18.9 †
L008	DE-23	8.6	12 †	6.03 †	4.58 †	12.2	7.22	6.48	6.06 †	3.77	13.5	6.39	8.18
L009	GJ-23	8.37	14.5	7.42	5.29	12.3	7.45	6.45	11.8	3.94	12.1	5.39	7.44
L011	GJ-23	9.02	14	7.47	5.32	12.1	6.61 †	6.19	10.4	3.78	11.7	6.32	8.24
L013	DN-23	9.16	14	8.37 †	5.38	11.4	7.27	6.2	10.4	3.62	11	5.92	7.55
L015	GJ-23	8.39	13.4	7.11	5.24	11	7.18	6.04	8.95	5.35 †	13.5	7.36 †	8.91 †
L016	GI-23	8.9	14.1	7.45	5.44	12.7	7.41	7.06 †	10.5	3.57	13.5	6.13	7.89
L018	GJ-23	9.29	15 †	7.68	5.5	12.1	7.04	6.74	11.7	3.61	11.4	5.99	7.89
L019	AE-24	8.08	13	7.24	5.18	11.4	7.58	6.33	9.52	4.1	16.7	6.26	8.56
L022	DE-23	8.6	13.6	7.11	5.1	11.6	7.3	6.49	11.5	3.67	12.5	5.9	8.05
L023	DN-23	8.02	12.9	7.09	4.62 †	11.6	6.97	6.62	10.4	3.12	9.57	5.49	7.44
L026	GI-23	8.59	13.7	7.03	4.66	11.8	7.55	6.4	9.55	3.52	19.3	6.14	8.22
L028	DE-23	8.5	13.6	7.14	5.37	13.6	7.9	7.2 †	10.9	4.1	12.5	6.5	8.4
L030	GJ-23					9.35 †	5.3 †	5.11 †	9.21				
L032	GG-23	8.18	14.5	6.9	4.94	10.9	6.69 †	5.83 †	10.3	3.39	11.1	5.76	7.67
L034	GC-23					12.6	7.44	6.44	11	3.92	12.7	5.61	7.26
L036	DE-23	8.4	14	7.6	5.3	12.2	7.56	6.42	13.3 †	3.75	13.5	6.06	7.92
L040	DE-23	8.77	14.1	7.38	5.22	12.4	7.5	6.54	11.3	3.71	15.2	5.9	7.51
L045	GI-23	9.28	13.9	8.64 †	5.91 †	25 †	7.07	5.88 †	9.82	4.04	15	6.33	8.79
L064	GJ-11	8.29	6.39 †	6.64	5.5	11	7	6.21	12.1	4.49 †	16	5.35	3.78 †
L079	GJ-23	9.67	13.2	6.97	5.31	10.8	7.4	6.3	9.7	3.2	7.8	5.2	6.6
L080	GJ-13	7.95	13.6	4.26 †	5.15	11.6	7.32	6.38	10	3.84	15.6	7.44 †	9.6 †
L097	DE-23	8.58	13.7	7.05	5.06	10.7	6.22 †	5.66 †	8.46	3.43	25.2 †	5.59	7.57
L133	GG-23	9.32	13.5	7.81	5.2	10.7	6.12 †	5.89 †	8.46				
L135	DN-23	8.38	13.3	7.28	5.06	11.6	6.66 †	6.5	10.2	2.78 †	13.9	5.17	7.1
L139	AD-23	7.98	10.2 †	6.77	5.76	12.3	6.31 †	6.89 †	0.73 †	3.13	12.6	5.43	8.11
L142	GJ-13					10	6.32 †	5.1 †	8.04				
L156	GI-24	8.91	14.5	7.92	5.61	12.5	7.87	6.77	11.7	10.3 †	17	8.5 †	11.1 †
L164	GJ-11	8.16	13.5	7.3	7.48 †	11.5	6.39 †	5.09 †	8.82	4.1	18.1	6.05	7.32
L165	GG-23	7.95	12.9	6.7	4.75	12	8	6.3	10	3.6	16.7	5.95	7.6
L178	DE-23	9.01	14.5	7.2	5.23	12.4	7.39	6.49	11.5	3.75	15.5	5.9	7.62
L179	GH-23	8.8	13.5	7.9	5.5	11.3	7.69	6.43	9.9	4	16.9	6.11	7.26
L180	ZZ-38									3.32	10.8	5.46	6.8

Lab. Code #	Method Codes	Plant sample identification and values for 2011-12: Iron (mg Fe/kg)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L002	AD-09									420 †	358 †	322 †	224 †
L005	GI-23	31.6 †	77.2	227	86.3								
L007	AD-13	59	62.8 †	200	90.5	96.5 †	55.5 †	69 †	27.5 †	109 †	31 †	176 †	143 †
L008	DE-23	68.8	78.2	362 †	107	121	102	87.6	23.2 †	202 †	265	282 †	74.4
L009	GJ-23	70.9	103 †	219	103	127	112	87.3	52.7 †	173	241	224	73.9
L011	GJ-23	67.8	76.5	219	110	147 †	117	107 †	50.7	173	232	241	69.9
L013	DN-23	68.3	85.2	201	112	119	106	93.4	46.9	193	234	230	70
L015	GJ-23	73.4	84.9	221	112	129	112	89.4	48	198	244	238	75.4
L016	GJ-23	71.2	79.6	239	108	121	106	94.1	46.7	169	249	233	65.6
L018	GJ-23	72	92.3 †	225	115	131	107	97.8	50.7	187	253	257 †	71.7
L019	AE-24	57.7 †	70.8	178	101	115	102	79.9	46.7	182	237	242	92.9 †
L022	DE-23	68	77	231	102	125	107	89	45	169	256	231	68
L023	DN-23	62.4	75.5	261	103	125	104	92.5	42.3	162	238	232	66.5
L026	GI-23	71.6	78.8	223	98	121	104	91.6	46.3	172	248	255 †	75.9
L028	DE-23	68.8	77.8	271	108	129	107	91.1	43.9	177	242	230	66.5
L030	GJ-23					125	90.7	89.6	42.8				
L032	GG-23	12.9 †	61.7 †	156 †	74.6 †	104 †	75.8 †	67.4 †	19.9 †	120 †	101 †	154 †	51.6 †
L034	GC-23					116	99.3	84.1	39.9	165	212 †	211 †	61.9
L036	DN-23	61.1	79.2	236	113	121	96	89.7	46.8	178	224	231	67.4
L040	DE-23	65.6	74.3	211	94.7	117	108	87.5	43.5	173	244	236	67.7
L045	GI-23	65	69	187	92.9	109	99.2	78.5	44.2	164	228	223	69.6
L064	GJ-11	70.6	64.5 †	231	105	124	100	88.8	44.6	164	226	225	72.6
L079	GJ-23	64.5	75	262	103	111	107	93.5	43.1	181	244	237	69
L080	GJ-13	68.2	77.2	275	104	118	94.5	89.8	44.8	167	234	236	78.6
L097	DE-23	70.3	71.4	203	102	109	92.2	83.9	41.1	164	244	237	67.1
L133	GG-23	68.2	73.3	194	96.4	110	86.6 †	84.8	41.2				
L135	DN-23	81.1 †	87.7 †	222	122	134	106	100	54.3 †	178	281 †	233	82.8 †
L139	AD-23	68.6	56.6 †	187	106	169 †	92.6	129 †	77.5 †	160	264	227	93.4 †
L142	GJ-13					110	130 †	86.9	63.8 †				
L156	GI-24	59.9	76.5	179	108	121	98.2	84.5	37 †	223 †	297 †	320 †	96 †
L164	GJ-11	53.1 †	67.3	172	81.9 †	131	140 †	127 †	54.7 †	174	244	190 †	100 †
L165	GG-23	64	66.7	152 †	87.9	105	100	81	45	163	215 †	208 †	60.1
L178	DE-23	66.4	76.1	221	96.5	118	104	84.6	44.1	168	238	232	66.4
L179	GH-23	71	86	306 †	149 †	126	109	96.8	49.2	189	251	256 †	68.5
L180	ZZ-38									178	250	228	70.2

Lab. Code #	Method Codes	Plant sample identification and values for 2011-12: Lead (mg Pb/kg)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L008	DE-24	0.007	0.09	0.29 †	0.091	0.128	0.197 †	0.219	0.007	0.178 †	0.12	0.145 †	0.104
L009	GJ-23	0.01	0.23 †	0.21	0.121	0.3 †	0.233	0.219	0.065	0.142	0.104	0.118	0.17
L011	DE-23	0.026 †	0.19	0.28 †	0.109	0.168 †	0.231	0.237	0.128	0.118	0.086	0.131	0.165
L013	DN-23	0.014	0.09	0.20	0.099	0.122	0.209 †	0.252	0.023	0.152	0.148	0.124	0.1
L019	AE-24	0.025 †	0.13	0.21	0.1	0.125	0.233	0.215	0.035	0.158	0.106	0.126	0.105
L022	DE-24	0.02	0.11	0.22	0.11	0.152	0.245	0.24	0.035	0.14	0.12	0.13	0.11
L023	DN-24	0.007	0.08	0.22	0.088	0.121	0.227	0.218	0.023	0.115	0.109	0.121	0.08
L028	DE-24	0.016	0.12	0.23	0.1	0.13	0.25 †	0.25	0.02	0.03 †	0.03 †	0.03 †	0.03
L032	GG-24	0.043 †	0.10	0.19	0.115	0.128	0.181 †	0.187	0.033	0.144	0.127	0.172 †	0.097
L040	DE-24	0.01	0.13	0.23	0.105	0.17 †	0.23	0.226	0.071	0.151	0.143	0.128	0.138
L079	GJ-23	0.01	0.17	0.09 †	0.01 †	0.02 †	0.24	0.19	0.11				
L133	GG-23	0.185 †	0.09	0.17	0.061 †	0.238 †	0.14 †	0.144 †	0.095				
L165	GG-23	0.1 †	0.95 †	0.8 †	0.6 †	0.5 †	0.4 †	0.4 †	0.05				
L178	DE-24	0.009	0.12	0.22	0.108	0.171 †	0.229	0.226	0.07	0.149	0.146	0.128	0.144

. Code #	Method Codes	Plant sample identification and values for 2011-12: Magnesium (%Mg)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L002	AD-09									0.131 †	0.197 †	0.159 †	0.165 †
L005	GI-23	0.109	0.33 †	0.39 †	0.292 †								
L007	AD-13	0.103	0.28	0.32	0.244	0.309	0.131 †	0.088 †	0.128	0.186 †	0.231 †	0.311 †	0.234
L008	DE-23	0.1	0.28	0.33	0.25	0.293	0.119	0.064	0.065 †	0.16	0.301	0.213	0.213
L009	GJ-23	0.099	0.25 †	0.32	0.246	0.271	0.118	0.067	0.127	0.16	0.281	0.21	0.201
L011	GJ-23	0.1	0.28	0.31	0.24	0.325	0.126	0.07	0.138	0.159	0.298	0.208	0.212
L012	GE-11	0.109	0.30	0.36 †	0.263	0.395 †	0.234 †	0.099 †	0.205 †	0.27 †	0.44 †	0.42 †	0.39 †
L013	DN-23	0.102	0.28	0.31	0.237	0.315	0.126	0.072	0.146	0.151	0.289	0.2	0.213
L015	GJ-23	0.104	0.29	0.33	0.254	0.326	0.137 †	0.075	0.14	0.174 †	0.319	0.226	0.223
L016	GI-23	0.103	0.28	0.32	0.241	0.311	0.123	0.07	0.137	0.156	0.302	0.21	0.209
L018	GJ-23	0.106	0.3	0.34	0.263	0.307	0.121	0.069	0.14	0.158	0.294	0.208	0.209
L019	AE-24	0.087 †	0.27	0.32	0.239	0.318	0.132 †	0.067	0.134	0.157	0.306	0.214	0.22
L022	DE-23	0.102	0.29	0.32	0.248	0.307	0.121	0.069	0.134	0.156	0.318	0.21	0.221
L023	DN-23	0.102	0.28	0.32	0.243	0.297	0.122	0.073	0.125	0.147	0.28	0.197	0.198
L026	GI-23	0.1	0.29	0.32	0.242	0.305	0.12	0.067	0.129	0.155	0.308	0.22	0.228
L028	DE-23	0.11	0.3	0.34	0.26	0.33	0.12	0.07	0.13	0.17	0.315	0.22	0.213
L030	GJ-23					0.277	0.108 †	0.063	0.128				
L032	GG-23	0.101	0.25	0.29 †	0.209 †	0.279	0.114	0.063	0.129	0.141 †	0.274	0.187	0.202
L034	GC-23					0.296	0.117	0.063	0.119	0.151	0.274	0.196	0.196
L036	DE-23	0.106	0.28	0.35	0.26	0.301	0.115	0.067	0.132	0.151	0.263 †	0.199	0.198
L040	DE-23	0.101	0.30	0.32	0.251	0.307	0.125	0.067	0.13	0.152	0.306	0.215	0.207
L042	GF-14	0.105	0.30	0.35	0.244	0.344 †	0.157 †	0.087 †	0.155 †	0.166	0.317	0.218	0.207
L045	GI-23	0.105	0.26	0.35 †	0.256	0.294	0.119	0.066	0.126	0.156	0.307	0.212	0.223
L064	GJ-11	0.096	0.27	0.32	0.238	0.318	0.128	0.07	0.137	0.169	0.34	0.218	0.239
L079	GJ-23	0.108	0.29	0.32	0.27	0.307	0.119	0.066	0.138	0.159	0.283	0.199	0.193
L080	GJ-13	0.105	0.27	0.33	0.249	0.291	0.137 †	0.087 †	0.127	0.16	0.309	0.227	0.242
L097	DE-23	0.101	0.28	0.31	0.234	0.283	0.114	0.063	0.126	0.162	0.31	0.217	0.219
L133	GG-23	0.098	0.28	0.33	0.251	0.268 †	0.099 †	0.057 †	0.105 †				
L135	DN-23	0.068 †	0.32 †	0.37 †	0.27	0.307	0.118	0.072	0.148	0.155	0.346 †	0.223	0.24
L139	AD-23	0.107	0.28	0.32	0.28 †	0.317	0.13 †	0.07	0.14	0.162	0.31	0.215	0.222
L142	GJ-13					0.283	0.123	0.072	0.123				
L156	GI-24	0.105	0.30	0.34	0.251	0.331	0.122	0.067	0.143	0.231 †	0.462 †	0.338 †	0.335 †
L164	GJ-11	0.116 †	0.29	0.34	0.26	0.308	0.119	0.065	0.13	0.141 †	0.277	0.196	0.2
L165	GG-23	0.102	0.29	0.32	0.243	0.39 †	0.15 †	0.09 †	0.19 †	0.19 †	0.35 †	0.25 †	0.24
L178	DE-23	0.106	0.29	0.33	0.248	0.302	0.123	0.068	0.134	0.151	0.298	0.215	0.211
L179	GH-23	0.1	0.27	0.32	0.35 †	0.293	0.122	0.067	0.137	0.153	0.293	0.195	0.178 †
L180	ZZ-38									0.158	0.329	0.198	0.407 †

Lab. Code #	Method Codes	Plant sample identification and values for 2011-12: Manganese (mg Mn/kg)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L002	AD-09									44.4 †	59.6 †	36.3 †	31.9 †
L005	GI-23	17.5	2150	17.4	40.2								
L007	AD-13	14.3 †	1940	14.3 †	37 †	80.5	67.8	87.3 †	49	44.7 †	122 †	65.1 †	37.8 †
L008	DE-23	17.6	2027	19.1	41.7	81.7	71.5	100	26 †	41	67.7	35	378
L009	GJ-23	17.9	1710	17.2	41	77.1	69.1	102	48.9	38.4	64.6	33.3	333
L011	GJ-23	16.9	2110	17.3	40.7	84.6	70.6	101	47.3	40.4	65.4	33.4	365
L013	DN-23	18.1	2095	23.4 †	44.4	82.2	71	105	48.9	41.6	63.6	32.8	364
L015	GJ-23	17.2	2024	19.1	42.1	76.9	68.7	98	44.1	40.4	63	32.7	344
L016	GI-23	18.2	2060	18.9	43.1	86.4	74.2	112	51.1	38.1	66.4	33.3	380
L018	GJ-23	18.3	2100	17.9	42.8	84.6	73.3	107	51.1	40.5	64.7	33.4	367
L019	AE-24	16.5	2133	17.6	42.7	78.1	68	95.1	43.7	39.6	67.2	34.1	362
L022	DE-23	18	1881	17.7	41.9	79.5	70.1	105	47.8	38.6	69.4	33.6	378
L023	DN-23	16.6	1970	18.6	42.5	83.7	74.2	109	46.4	37.4	64.7	33.2	354
L026	GI-23	19	1970	19.8	41.1	82.4	72.7	108	48.7	40	69	35.4	392
L028	DE-23	16.8	2050	17.4	42.3	84	71.5	104	46.5	40.8	65.7	32.6	357
L030	GJ-23					69.6 †	61.3 †	91.8	44.4				
L032	GG-23	14.7 †	1820	13.8 †	34.1 †	68.8 †	60.4 †	91.3	41	33.3 †	58.2 †	28.2 †	339
L034	GC-23					80.9	70.9	101	44.3	39	62.4	32.6	350
L036	DE-23	17.5	2003	19	43.2	80.8	68	104	46.8	39.1	60.9	33	362
L040	DE-23	17.6	1849	16.6	40.5	78.8	70.5	106	44.1	37.9	66.6	33.7	395
L045	GI-23	15.9	1756	16.9	38.5	74.3	65.3	94.7	43.3	36.5	64.1	32	366
L064	GJ-11	15.9	1783	17.4	40.3	71.9	66.3	108	38 †	38.8	82.2 †	31.2	668 †
L079	GJ-23	17.8	2020	17.7	43.9	91.5 †	76.6	113	54.8 †	44 †	68.9	35.4	393
L080	GJ-13	16.3	1520 †	22.3 †	39.2	81.6	67.9	104	44.2	37.7	63.9	34	369
L097	DE-23	18.3	2201	22.4 †	52.9 †	74.2	66.3	95.1	43.9	39.5	65.3	34.4	385
L133	GG-23	14.6 †	1905	17.2	37.9	78.1	62.8 †	104	45				
L135	DN-23	20.8 †	2087	20.6 †	47.9 †	84.2	70.5	114	52.9	40	77.4 †	35.4	412
L139	AD-23	17.9	1725	16.7	42.6	83.8	74.3	114	52.5	38	66.2	31.8	372
L142	GJ-13					82.6	69.5	103	42.1				
L156	GI-24	17.7	2206	17.9	43.8	89.3	78.8 †	114	53.6	58 †	99 †	54 †	658 †
L164	GJ-11	10.2 †	1775	17.9	39.8	95.5 †	98.2 †	168 †	41.2	29.8 †	62	28 †	350
L165	GG-23	16.8	2280	15.5	37.6	75	72	120 †	59 †	40	65.9	34.2	362
L178	DE-23	17.9	1794	16	41.7	77.9	70.8	102	44.2	37.9	65.1	33.2	391
L179	GH-23	19	1860	19	56 †	79.5	69.5	103	48.1	41.2	64.4	31.1	331
L180	ZZ-38									36.7	62.6	29 †	316

Lab. Code #	Method Codes	Plant sample identification and values for 2011-12: Molybdenum (mg Mo/kg)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L008	DE-24	17.7	0.1	0.06	4.28 †	0.183	0.163	0.222	0.24 †	0.671	0.217	0.478 †	0.023
L009	GJ-23	17.3	0.41 †	0.07	5.05	0.291 †	0.161	0.246	0.534 †	0.676	0.36 †	0.605	0.208 †
L011	GJ-23	15.1 †	0.73 †	0.38 †	4.43 †	0.125	0.173	0.266	0.59 †	0.689	0.217	0.631	0.077
L013	DN-23	18.2	0.18	0.08	5.64	0.19	0.172	0.224	0.459	0.701	0.244	0.579	0.055
L016	GJ-24	17.1	0.13	0.07	5.25	0.171	0.151	0.22	0.478	0.688	0.208	0.589	0.074
L018	GJ-23	17.8	0.09	0.02	4.98					0.744	0.332 †	0.585	0.051
L019	AE-24	20.1 †	0.15	0.10	5.97 †	0.178	0.176	0.214	0.467	0.651	0.208	0.53 †	0.074
L022	DE-24	17.1	0.09	0.08	5.13	0.195	0.165	0.238	0.47	0.695	0.224	0.59	0.078
L023	DN-24	17.2	0.12	0.07	5.1	0.164	0.156	0.212	0.47	0.668	0.202	0.575	0.055
L026	GI-23	17.3	0.22 †	0.09	5.63	0.163	0.15	0.223	0.473	0.714	0.238	0.639	0.089
L028	DE-24	17.1	0.33 †	0.11	5.10	0.21	0.18	0.24	0.48	0.77 †	0.3 †	0.61	0.09
L032	GG-24	15.2 †	0.14	0.12	4.98	0.214	0.187 †	0.249	0.482	0.664	0.219	0.602	0.096
L040	DE-24	17.3	0.14	0.06	5.18	0.198	0.149	0.256	0.56 †	0.693	0.154 †	0.586	0.061
L045	GI-23	16.5	0.48 †	0.19 †	4.51	0.48 †	0.096 †	0.192	0.48	27.2 †	0.002 †	2.78 †	0.002 †
L079	GJ-23	16.1	0.02	0.06	4.34 †	0.19	0.14	0.19	0.38 †	1.11 †	1.17 †	1.82 †	1.03 †
L097	DE-24	18	0.10	0.10	5.25	0.169	0.142	0.212	0.454	0.732	0.227	0.609	0.068
L133	GG-23	16.8	0.01	0.02	4.30 †	0.204	0.158	0.221	0.462				
L135	DN-23	19.4 †	0.08	0.03	4.94	0.161	0.067 †	0.142 †	0.4 †	0.685	0.24	0.635	0.055
L139	AD-23	16.7	0.09	0.05	5.43	0.164	0.138	0.233	0.338 †	0.625	0.189	0.552	0.066
L165	GG-23	15.9	0.3 †		4 †					0.2 †		0.05 †	
L178	DE-24	17.9	0.13	0.07	5.01	0.203	0.153	0.247	0.557 †	0.69	0.161 †	0.591	0.055
L179	GH-23	19.4 †	0.07	0.26 †	6.03 †	0.227	0.156	0.256	0.431 †	0.957 †	0.341 †	0.642	0.148 †

Lab. Code #	Method Codes	Plant sample identification and values for 2011-12: Nitrogen (%N)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L002	GE-32									4.2	2.68	3.26	2.56
L007	GE-38	4.1	1.48	1.06	3.58	2.43	1.26	1.85	1.84	4.48	2.65	2.94 †	3.22 †
L008	CA-37	4.96 †	2.28 †	2.35 †	4.32 †	2.56 †	1.21	2.05 †	1.88	4.9	2.79	2.36 †	2.71
L009	CA-37	4.1	1.64	1.01	3.83	2.33	1.12	1.83	1.72	4.81	2.74	3.29	2.65
L011	CA-37	3.88	1.57	1.15	3.76	2.34	1.15	1.85	1.75	4.55	2.8	3.32	2.71
L012	GE-30	3.43 †	1.66	1.06	3.26 †	1.94 †	0.879 †	1.25 †	1.43 †	4.98	3.02 †	3.36	2.79
L013	CA-37	4.34	1.57	1.01	4.04	2.49	1.16	1.9	1.83	5.16	2.95	3.59 †	2.84 †
L015	CA-37	4.31	1.52	1.01	3.96	2.34	1.08	1.8	1.78	4.92	2.81	3.4	2.68
L016	CA-37	4.1	1.53	1.07	3.84	2.42	1.25	1.9	1.81	4.83	2.84	3.38	2.65
L018	CA-37	4.14	1.48	0.94	3.86	2.29	0.855 †	1.7 †	1.76	4.62	2.82	3.18	2.53 †
L019	CA-37	4	1.5	1.06	3.74	2.38	1.16	1.84	1.75	4.58	2.69	3.22	2.65
L022	CA-37	4.06	1.49	1.05	3.83	2.35	1.11	1.85	1.75	4.75	2.82	3.27	2.72
L023	CA-37	4	1.44	0.90	3.67	2.3	1.02	1.76	1.72	4.53	2.66	3.17	2.54
L026	GE-31	4.12	1.51	0.93	3.73	2.38	1.06	1.84	1.8	4.58	2.91	3.32	2.74
L028	GE-31	4.26	1.53	0.99	3.97	2.45	1.11	1.94	1.88	4.92	2.82	3.29	2.63
L030	CA-37					2.43	1.13	1.9	1.88				
L032	CA-37	3.98	1.43	0.94	3.74	2.3	1.08	1.8	1.74	4.57	2.75	3.28	2.68
L034	GE-31					2.43	1.12	1.88	1.86	4.91	2.86	3.34	2.69
L036	CA-37	4.35	1.65	1.1	4	2.6 †	1.29	1.99	1.92	5.05	2.92	3.29	2.64
L040	CA-37	4.14	1.48	1.01	3.83	2.38	1.06	1.81	1.79	4.76	2.85	3.31	2.65
L042	CA-37	4.2	1.54	0.97	3.96	2.49	1.19	1.91	1.89	4.87	2.79	3.32	2.7
L045	CA-37	3.96	1.58	1.07	0.37 †	2.4	1.31	1.88	1.75	4.57	2.74	3.27	2.67
L046	CA-37	3.97	1.42	0.91	3.74	2.27	1.05	1.77	1.7				
L064	GE-30	4.28	1.64	1	3.99	2.61 †	1.06	1.9	1.82	4.79	2.5 †	3.23	2.56
L079	CA-37	4.35	1.67	1.25 †	4.17	2.51	1.07	1.98	1.85	5.22	2.96	3.49	2.8
L097	CA-37	4.24	1.66	1.17	3.86	2.38	1.18	1.88	1.81	4.86	2.83	3.38	2.65
L135	CA-37	4.19	1.88 †	1.42 †	4.11	2.34	1.18	1.89	1.72	4.87	3.04 †	3.49	2.85 †
L139	CA-37	4.28	1.57	0.92	3.98	2.44	1.07	1.86	1.79	4.69	2.79	3.22	2.67
L142	GF-32					2.08 †	0.964	1.53 †	1.44 †				
L156	CA-37	4.32	1.54	1	3.98	2.45	1.23	1.93	1.87	4.98	2.91	3.44	2.78
L164	GE-32	3.84	1.43	0.95	3.23 †	2.36	0.987	1.74	1.69	4.4	2.75	3.21	2.6
L165	CA-37	3.62 †	1.35 †	0.86	3.39 †	1.3 †	1.3	2.1 †	1.6 †	4.69	2.69	3.18	2.8
L178	CA-37	4.08	1.48	0.98	3.87	2.4	1.12	1.87	1.75	4.81	2.8	3.34	2.67
L179	GE-31	4.16	1.46	0.94	3.71	2.05 †	0.946	1.62 †	1.57 †	4.41	2.63	3.13	2.54
L182	GE-31	3.98	1.36	0.76 †	3.73	2.28	1.07	1.76	1.7	4.39	2.63	3.17	2.55

Lab. Code #	Method Codes	Plant sample identification and values for 2011-12: Phosphorus (%P)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L002	GE-30									0.604	0.445	0.309	0.135
L005	GI-23	0.382 †	0.10	0.04 †	0.45								
L007	GE-30	0.327	0.11	0.06	0.427	0.207	0.243	0.164	0.392	0.638	0.128 †	0.498 †	0.316 †
L008	DE-23	0.28 †	0.11	0.06	0.39	0.218	0.227	0.151 †	0.183 †	0.647	0.445	0.324	0.136
L009	GJ-23	0.323	0.13	0.06	0.439	0.242	0.238	0.168	0.416	0.722	0.527	0.325	0.132
L011	GJ-23	0.329	0.12	0.06	0.421	0.236	0.241	0.168	0.418	0.691	0.5	0.321	0.131
L012	GE-30	0.374 †	0.18 †	0.1 †	0.484	0.151 †	0.171 †	0.124 †	0.328 †	0.33 †	0.26 †	0.17 †	0.11
L013	DN-23	0.327	0.12	0.06	0.436	0.235	0.245	0.172	0.412	0.68	0.5	0.329	0.13
L015	GJ-23	0.318	0.11	0.06	0.429	0.231	0.249	0.168	0.391	0.72	0.507	0.329	0.138
L016	GI-23	0.329	0.11	0.06	0.418	0.23	0.239	0.17	0.407	0.672	0.487	0.318	0.123
L018	GJ-23	0.33	0.12	0.06	0.446	0.226	0.234	0.168	0.406	0.677	0.482	0.316	0.125
L019	AE-24	0.289 †	0.11	0.06	0.404	0.236	0.258 †	0.171	0.382	0.677	0.506	0.33	0.137
L022	DE-23	0.331	0.11	0.07	0.431	0.226	0.239	0.166	0.408	0.688	0.531	0.328	0.135
L023	DN-23	0.324	0.11	0.06	0.421	0.221	0.245	0.169	0.393	0.638	0.479	0.3 †	0.122
L026	GI-23	0.321	0.12	0.06	0.427	0.225	0.233	0.164	0.383	0.696	0.509	0.336	0.141
L028	DE-23	0.34	0.12	0.07	0.45	0.23	0.24	0.17	0.42	0.77	0.52	0.33	0.13
L030	GJ-23					0.198 †	0.205 †	0.148 †	0.372				
L032	GG-23	0.301 †	0.10	0.05 †	0.396	0.203 †	0.21 †	0.145 †	0.364	0.612	0.442 †	0.281 †	0.121
L034	GC-23					0.229	0.238	0.164	0.395	0.72	0.493	0.323	0.124
L036	DE-23	0.323	0.12	0.06	0.436	0.217	0.218	0.16	0.379	0.657	0.444	0.304	0.12
L040	DE-23	0.334	0.12	0.06	0.458	0.223	0.236	0.168	0.375	0.705	0.516	0.327	0.139
L042	GF-31	0.331	0.11	0.06	0.438	0.221	0.238	0.163	0.411	0.714	0.505	0.33	0.134
L045	GI-23	0.285 †	0.09 †	0.06	0.378 †	0.21	0.219	0.151 †	0.383	0.687	0.516	0.334	0.137
L064	GJ-30	0.322	0.12	0.07	0.441	0.23	0.244	0.172	0.402	0.71	0.518	0.299 †	0.128
L079	GJ-23	0.319	0.11	0.06	0.442	0.22	0.228	0.156	0.386	0.738	0.5	0.323	0.127
L080	GJ-30	0.319	0.11	0.06	0.408	0.217	0.234	0.159	0.389	0.647	0.469	0.297 †	0.121
L097	DE-23	0.32	0.12	0.06	0.419	0.214	0.231	0.161	0.392	0.73	0.521	0.341	0.138
L135	DN-23	0.373 †	0.15 †	0.08 †	0.481	0.231	0.226	0.174	0.42	0.652	0.562 †	0.338	0.149
L139	AD-23	0.35 †	0.15 †	0.07	0.482	0.245	0.267 †	0.184 †	0.382	0.573	0.442 †	0.327	0.155 †
L142	ZZ-30					0.113 †	0.118 †	0.076 †	0.228 †				
L156	GI-24	0.341	0.12	0.06	0.441	0.245	0.26 †	0.179	0.516 †	1.02 †	0.763 †	0.514 †	0.21 †
L164	GJ-30	0.301 †	0.11	0.05 †	0.402	0.231	0.233	0.174	0.46 †	0.636	0.492	0.31	0.146
L165	GG-23	0.316	0.11	0.06	0.413	0.23	0.21 †	0.19 †	0.34 †	0.72	0.51	0.33	0.13
L178	DE-23	0.33	0.12	0.06	0.452	0.228	0.232	0.171	0.374	0.712	0.511	0.336	0.135
L179	GH-23	0.34	0.12	0.07	0.59 †	0.208	0.227	0.159	0.394	0.595	0.486	0.293 †	0.114
L180	ZZ-38									0.868 †	0.661 †	0.382 †	0.236 †
L182	GE-31	0.31	0.11	0.05 †	0.414	0.21	0.225	0.152 †	0.377	0.646	0.467	0.317	0.121

Lab. Code #	Method Codes	Plant sample identification and values for 2011-12: Potassium (%K)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L002	GE-09									3.89	2.26	2.67 †	0.698 †
L005	GI-23	0.892	0.93	2.42	3.93								
L007	GE-09	0.943	1.01	2.57	3.72	1.56	2.1 †	0.738 †	0.423	3.85	0.825 †	2.64 †	3.12 †
L008	DE-23	0.92	1	2.48	3.94	1.4	1.71	0.612 †	0.174 †	3.66	2.37	3.01	0.778
L009	GJ-23	0.874	0.93	2.51	3.96	1.39	1.74	0.68	0.365	3.72	2.53	3.11	0.931 †
L011	GJ-23	1.12 †	1.06	2.23 †	3.35 †	1.42	1.83	0.688	0.48 †	3.86	2.72	3.2	0.891 †
L012	GE-11	0.803 †	0.87 †	2.43	3.81	1.32	1.55	1.77 †	0.311	2.42 †	0.76 †	3.04	0.95 †
L013	DN-23	0.898	1	2.6	4.06	1.48	1.86	0.672	0.356	3.93	2.52	3.15	0.79
L015	GJ-23	0.885	0.99	2.58	3.96	1.51	1.86	0.696	0.362	3.79	2.56	3.15	0.812
L016	GI-23	0.91	1.01	2.54	3.96	1.52	1.85	0.715	0.371	3.7	2.54	3.14	0.76
L018	GJ-23	0.928	1.03	2.51	3.77	1.48	1.86	0.684	0.391	3.6	2.5	3	0.795
L019	AE-24	0.857	0.96	2.52	3.95	1.55	1.98	0.727	0.384	3.8	2.7	3.26	0.855
L022	DE-23	0.9	0.96	2.59	3.96	1.47	1.8	0.686	0.396	3.62	2.62	3.14	0.796
L023	DN-23	0.83	0.93	2.45	3.92	1.35	1.72	0.665	0.344	3.39	2.39	2.98	0.729
L026	GI-23	0.899	1.02	2.41	3.84	1.53	1.78	0.67	0.356	3.76	2.7	3.23	0.817
L028	DE-23	0.98 †	1.07	2.64	4.24	1.59	1.91	0.73	0.38	3.95	2.6	3.19	0.77
L030	GJ-23					1.34	1.65	0.627	0.347				
L032	GG-23	0.799 †	0.88 †	2.35	3.79	1.29	1.59	0.57 †	0.311	3.23 †	2.19 †	2.66 †	0.663 †
L034	GC-23					1.5	1.84	0.684	0.354	3.71	2.46	3.05	0.777
L036	DE-23	0.952	1.04	2.4	2.65 †	1.41	1.71	0.676	0.364	3.14 †	2.05 †	2.57 †	0.704 †
L040	DE-23	0.871	0.99	2.48	3.97	1.44	1.78	0.663	0.323	3.67	2.51	3.18	0.818
L042	GF-09	0.933	1.01	2.43	3.77	1.49	1.71	0.79 †	0.32	4.03	2.59	3.32	1.05 †
L045	GI-23	0.901	0.88 †	2.46	3.84	1.38	1.73	0.646	0.349	3.56	2.49	2.98	0.78
L064	GJ-11	0.814 †	0.85 †	2.61	3.9	1.29	1.7	0.684	0.302	3.75	1.83 †	2.99	0.809
L079	GJ-23	0.872	0.96	2.48	4.02	1.4	1.69	0.634	0.355	3.95	2.52	3.1	0.78
L080	GJ-13	0.893	1.12 †	2.37	3.86	1.42	1.78	0.783 †	0.573 †	3.59	2.82	3.31	1.37 †
L097	DE-23	0.888	1.01	2.45	3.79	1.35	1.74	0.632	0.35	3.9	2.64	3.24	0.865
L133	GG-23	0.85	0.96	2.56	4.06	1.19 †	1.35 †	0.56 †	0.285				
L135	DN-23	0.96	1.07	2.67	4.13	1.49	1.73	0.711	0.395	3.41	2.66	3.04	0.79
L139	AD-23	0.892	0.90	2.94 †	4.1	1.47	1.92	0.665	0.252 †	3.85	2.71	3.21	0.76
L142	GJ-13					1.2 †	1.44 †	0.637	0.35				
L156	GI-24	0.886	0.98	2.50	3.79	1.48	1.89	0.687	0.407	4.98 †	3.55 †	4.35 †	1.07 †
L164	GJ-11	0.883	0.97	2.28	3.03 †	1.54	1.94	0.723	0.389	3.86	2.49	3.18	0.78
L165	GG-23	0.856	0.97	2.51	3.85			0.83 †	0.49 †	4.01	2.65	3.29	0.815
L178	DE-23	0.869	0.99	2.51	4.08	1.47	1.75	0.668	0.331	3.61	2.47	3.15	0.818
L179	GH-23	0.92	1.07	2.74	4.19	1.45	1.8	0.672	0.359	3.62	2.65	3.28	8.11 †
L180	ZZ-38									3.61	2.84	2.5 †	0.92 †

Lab. Code #	Method Codes	Plant sample identification and values for 2011-12: Selenium (mg Se/kg)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L008	DE-24	0.1 †	0.05	0.00	0.07 †	0.245 †	0.091 †	0.096 †	0.036	0.051 †	0.002	0.021	0.015 †
L009	GJ-23	0.468	0.19 †	0.02	0.122	0.015 †	0.025	0.053	0.045 †	0.196	0.05	0.02	0.228 †
L011	DE-23					0.075	0.061	0.144 †	0.122 †				
L013	DN-23	0.456	0.03	0.01	0.141	0.131 †	0.039	0.069 †	0.022	0.183	0.006	0.01	0.04
L016	GJ-24	0.438	0.03	0.01	0.107	0.096	0.029	0.05	0.021	0.181	0.012	0.016	0.032
L019	AE-24	0.088 †	0.07 †	0.06 †	0.152	0.078	0.327 †	0.08 †	0.04	0.303 †	0.075	0.1 †	0.069 †
L022	DE-24	0.43	0.02	0.02	0.142	0.12	0.04	0.055	0.015	0.185	0.01	0.019	0.036
L023	DN-24	0.465	0.03	0.01	0.135	0.106	0.029	0.054	0.021	0.217	0.011	0.015	0.029
L026	GI-23	0.133 †	0.03	0.02	0.078	0.071	0.015	0.053	0.026	0.207	0.031	0.036 †	0.053 †
L028	DE-23	0.466	0.03	0.01	0.126	0.11	0.04	0.06	0.03	0.21	0.035	0.035 †	0.035
L032	GG-24	0.5 †	0.06 †	0.08 †	0.291 †	0.245 †	0.138 †	0.125 †	0.051 †	0.352 †	0.057	0.068 †	0.097 †
L040	DE-24	0.447	0.03	0.03	0.119	0.085	0.033	0.051	0.016	0.192	0.044	0.018	0.033
L079	GJ-23	0.22 †	0.14 †	0.01	0.4 †	0.49 †	0.1 †	0.25 †	0.35 †				
L097	DE-24	0.464	0.03	0.00	0.109	0.086	0.02	0.048	0.021	0.194	0.01	0.013	0.02
L133	GG-02					2.29 †	1.94 †	2.12 †	2.22 †				
L178	DE-24	0.451	0.02	0.03	0.131	0.083	0.029	0.051	0.017	0.185	0.044	0.017	0.035
L179	GH-22	0.54 †	0.03	0.02	0.11	0.085	0.025	0.05	0.02	0.18	0.005	0.005 †	0.025

Lab. Code #	Method Codes	Plant sample identification and values for 2011-12: Silicon (%Si)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L009	DE-23	0.021	0.33 †	0.07	0.04	0.05 †	0.19	0.023	0.04	0.03	0.04 †	0.03	0.015 †
L011	ZZ-23	0.006	1.74	0.09	0.049	0.214	0.574	0.035	0.11	0.049	0.341 †	0.127	0.045
L015	ZZ-23	0.001	1.79	0.16	0.051	0.23	0.68	0.02	0.089	0.088 †	0.45	0.209	0.042
L019	AE-24	0.011	0.02 †	0.03	0.027	0.055 †	0.045	0.029	0.046	0.03	0.047 †	0.035	0.027 †
L040	DB-31	0.018	1.89	0.09	0.076	0.213	0.23	0.035	0.076	0.033	0.434	0.126	0.047
L133	GG-23	0.002	0.01 †	0.01	0.006	0.001 †	0.003	0.005	0.001				
L178	DB-31	0.017	1.92	0.11	0.071	0.201	0.22	0.034	0.081	0.036	0.441	0.126	0.047

Lab. Code #	Method Codes	Plant sample identification and values for 2011-12: Sodium (%Na)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L002	AD-09									0.072	0.022 †	0.053	0.09
L005	GI-23	0.005 †	0.00 †	0.13	0.199								
L007	AD-09	0.001	0.00	0.15	0.266 †	0.01	0.1 †	0.04	0.004	0.106 †	0.111 †	0.034 †	0.089
L008	DE-23	0.001	0.00	0.13	0.215	0.009	0.09	0.04	0.002	0.065	0.011	0.052	0.095
L009	GJ-23	0.002	0.01 †	0.14	0.214	0.01	0.089	0.041	0.004	0.067	0.012	0.048	0.106
L011	GJ-23	0.001	0.00	0.13	0.194	0.011	0.091	0.041	0.003	0.064	0.012	0.053	0.109
L012	GE-11	0.061 †	0.05 †	0.16 †	0.259 †	0.157 †	0.117 †	0.061 †	0.073 †	0.16 †	0.04 †	0.02 †	0.08 †
L013	DN-23	0.003	0.00	0.14	0.218	0.007	0.092	0.043	0.002	0.067	0.01	0.051	0.099
L015	GJ-23	0.001	0.01	0.14	0.216	0.01	0.098 †	0.046 †	0.006	0.072	0.016 †	0.055	0.1
L016	GI-23	0.002	0.00	0.14	0.219	0.007	0.093	0.043	0.002	0.064	0.009	0.048	0.096
L018	GJ-23	0.001	0.01	0.14	0.233	0.008	0.092	0.044 †	0.003	0.065	0.01	0.05	0.104
L019	AE-24	0.001	0.00	0.12 †	0.184	0.008	0.09	0.04	0.003	0.064	0.011	0.048	0.098
L022	DE-23	0.002	0.01	0.14	0.213	0.009	0.088	0.041	0.004	0.063	0.011	0.049	0.098
L023	DN-23	0.0004	0.00	0.13	0.199	0.006	0.084	0.038 †	0.002	0.055 †	0.009	0.042 †	0.085 †
L026	GI-23	0.0003	0.00	0.13	0.204	0.007	0.088	0.040	0.002	0.063	0.01	0.048	0.103
L028	DE-23	0.003	0.00	0.14	0.228	0.008	0.094	0.043	0.002	0.068	0.01	0.05	0.096
L030	GJ-23					0.005	0.082 †	0.037 †	0.0001				
L032	GG-23	0.009 †	0.01 †	0.13	0.212	0.009	0.008 †	0.038 †	0.004	0.059	0.012	0.046	0.093
L034	GC-23					0.007	0.091	0.041	0.002	0.067	0.01	0.048	0.096
L036	DE-23	0.0004	0.00	0.14	0.232	0.008	0.087	0.038	0.003	0.065	0.01	0.047	0.089
L040	DE-23	0.002	0.00	0.13	0.218	0.014 †	0.091	0.041	0.004	0.062	0.007 †	0.049	0.113 †
L045	GI-23	0.002	0.00	0.13	0.205	0.007	0.087	0.039	0.004	0.062	0.011	0.047	0.096
L064	GJ-11	0.001	0.00	0.15	0.222	0.012 †	0.088	0.04	0.005	0.069	0.011	0.051	0.102
L079	GJ-23	0.001	0.00	0.14	0.227	0.007	0.093	0.041	0.003	0.075 †	0.011	0.052	0.105
L080	GJ-13	0.035 †	0.04 †	0.12 †	0.163 †	0.039 †	0.093	0.062 †	0.024 †	0.044 †	0.002 †	0.02 †	0.036 †
L097	DE-23	0.002	0.00	0.13	0.206	0.007	0.085	0.037 †	0.002	0.067	0.011	0.051	0.102
L133	GG-23	0.003	0.01	0.14	0.214	0.007	0.067 †	0.031 †	0.002				
L135	DN-23	0.004 †	0.01	0.14	0.233	0.008	0.088	0.044 †	0.003	0.065	0.015 †	0.053	0.102
L139	AD-23	0.001	0.02 †	0.14	0.192	0.01	0.09	0.04	0.001	0.06	0.012	0.053	0.1
L156	GI-23					0.007	0.097	0.041	0.002	0.089 †	0.017 †	0.07 †	0.43 †
L164	GJ-11	0.003	0.01	0.13	0.207	0.01	0.09	0.04	0.004	0.062	0.009	0.048	0.094
L165	GG-23	0.05 †	0.00	0.13	0.204		0.11 †	0.05 †					0.11
L178	DE-23	0.002	0.00	0.13	0.221	0.013 †	0.089	0.041	0.004	0.062	0.007 †	0.049	0.116 †
L179	GH-23	0.002	0.01	0.16 †	0.24	0.009	0.088	0.041	0.006	0.063	0.01	0.051	0.098
L180	ZZ-38									0.117 †	0.089 †	0.076 †	0.232 †

Lab. Code #	Method Codes	Plant sample identification and values for 2011-12: Sulfur (%S)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L008	DE-23	0.21	0.1	0.14	1.33	0.226	0.165	0.127	0.079 †	0.892	0.192	0.333	0.163
L009	GJ-23	0.209	0.09	0.14	1.29	0.197 †	0.16	0.124	0.135	0.845	0.29 †	0.355	0.262 †
L011	GJ-23	0.206	0.10	0.14	1.23	0.233	0.167	0.131	0.163	0.85	0.21	0.347	0.178
L013	DN-23	0.205	0.10	0.15	1.22	0.216	0.162	0.115 †	0.154	0.855	0.188	0.331	0.172
L015	GJ-23	0.213	0.10	0.15	1.36	0.23	0.172	0.133	0.16	0.866	0.218	0.356	0.18
L016	GI-23	0.211	0.10	0.14	1.27	0.221	0.163	0.13	0.159	0.831	0.207	0.344	0.175
L018	GJ-23	0.214	0.10	0.16	1.39	0.222	0.157	0.129	0.159	0.816	0.198	0.331	0.172
L019	CA-37	0.229	0.10	0.14	1.35	0.251 †	0.192 †	0.145 †	0.167	0.907 †	0.218	0.364	0.189
L022	DE-23	0.205	0.10	0.15	1.28	0.217	0.163	0.128	0.158	0.834	0.215	0.343	0.175
L023	DN-23	0.207	0.10	0.15	1.31	0.225	0.17	0.134	0.161	0.794 †	0.206	0.329	0.172
L026	GI-23	0.216	0.10	0.15	1.32	0.223	0.163	0.128	0.153	0.853	0.213	0.361	0.188
L028	DE-23	0.224	0.10	0.15	1.35	0.24	0.166	0.132	0.162	0.893	0.209	0.344	0.172
L030	GJ-23					0.209	0.15	0.121	0.153				
L032	GG-23	0.199	0.1	0.14	1.22	0.199 †	0.144 †	0.114 †	0.141	0.715 †	0.188	0.304	0.167
L034	GC-23					0.217	0.157	0.123	0.148	0.787 †	0.188	0.314	0.161
L036	DE-23	0.217	0.10	0.15	1.35	0.216	0.152	0.125	0.152	0.787 †	0.179 †	0.314	0.159
L040	DE-23	0.213	0.12 †	0.15	1.28	0.231	0.164	0.124	0.15	0.841	0.216	0.348	0.169
L045	GI-23	0.219	0.09	0.16	1.34	0.214	0.159	0.126	0.154	0.914 †	0.242 †	0.391 †	0.206 †
L064	BA-30	0.204	0.11	0.15	1.38	0.229	0.166	0.135	0.156	0.85	0.204	0.332	0.179
L079	GJ-23	0.198	0.11	0.16	1.35	0.226	0.162	0.129	0.148	0.859	0.218	0.349	0.187
L097	DE-23	0.219	0.11	0.15	1.34	0.211	0.156	0.125	0.153	0.873	0.217	0.361	0.182
L133	GG-23	0.2	0.09	0.14	1.4	0.181 †	0.121 †	0.103 †	0.114 †				
L135	DN-23	0.217	0.11	0.16	1.29	0.226	0.156	0.133	0.169	0.7 †	0.21	0.32	0.17
L139	CA-37	0.188 †	0.08 †	0.11 †	1.29	0.234	0.174	0.126	0.167	0.835	0.195	0.326	0.164
L156	GI-24	0.223	0.11	0.15	1.63 †	0.262 †	0.197 †	0.157 †	0.227 †	1.23 †	0.343 †	0.555 †	0.299 †
L164	GJ-33	1.11 †	0.15 †	0.14	1 †	0.192 †	0.129 †	0.113 †	0.143				
L165	GG-23	0.198	0.08 †	0.13	1.26	0.22	0.12 †	0.12	0.07 †	0.835	0.12 †	0.265 †	0.04 †
L178	DE-23	0.209	0.12 †	0.15	1.31	0.222	0.167	0.127	0.151	0.845	0.218	0.346	0.171
L179	GH-23	0.25 †	0.11	0.17 †	1.69 †	0.217	0.163	0.131	0.161	0.82	0.214	0.328	0.179
L180	ZZ-38									1.19 †	0.418 †	0.472 †	0.332 †

Lab. Code #	Method Codes	Plant sample identification and values for 2011-12: Zinc (mg Zn/kg)											
		October 2010 (Round 111)				*February 2011 (Round 311)*				*April 2011 (Round 511)*			
		ASP 101	ASP 102	ASP 103	ASP 104	ASP 21	ASP 22	ASP 23	ASP 24	ASP 41	ASP 42	ASP 43	ASP 44
L002	AD-09									34.8	42.5	24.2 †	22.6
L005	GI-23	69.8 †	6.22 †	19.5 †	32.5								
L007	AD-13	49.8	12	20.3	37.3 †	40	20.8 †	66	18 †	33.3	39.3	39.3 †	23.3
L008	DE-23	49	11.3	21.9	33	43.8	27.1	71.2	14.7 †	31.9	37.1	20.3	19
L009	GJ-23	50.9	16.1 †	22.7	34.5	44.4	26.9	73.5	30.9	32.1	38.1	20.5	22
L011	GJ-23	51.6	12.5 †	22.6	34.5	45.3	27	76.2	27.3	32.7	36.9	22.1	22
L013	DN-23	51.9	11.7	24.7	35	41.1	26.4	68.8	25.7	32.4	38	19.8	18
L015	GJ-23	49.6	13.4 †	23.3	36.6	41.4	27.2	69.3	26.7	36.9 †	39.7	23.4 †	22.8
L016	GI-23	49.3	11.5	22.6	33.6	42.9	26.6	74.3	27.5	32.3	39.7	20.6	20.2
L018	GJ-23	51.3	12.1	22.7	35.6	42.6	26.8	71	27.5	33.3	36.9	20.9	20.7
L019	AE-24	47.1 †	11.6	21.8	33.8	41.8	26.8	70.3	26.1	32.8	40.5	21.8	21.8
L022	DE-23	49.5	11.3	22	33.9	41.5	26.2	71.7	26.9	31.8	38.6	20.5	20.6
L023	DN-23	47.3	11.6	22.8	34.4	42.2	27.8	75.2	26.8	30	35	19.4	19.3
L026	GI-23	50.7	11.5	21.3	32.2	43.5	28	73.3	27.6	33.4	43.4	21.6	22.1
L028	DE-23	52.5	12.5 †	24.1	37.1 †	45.2	26.9	74.7	27	35.2	39.9	21	20.1
L030	GJ-23					36.8 †	22.2 †	64.4	25.5				
L032	GG-23	50.9	11.8	22.4	34.5	37.7 †	23.3 †	64.5	25	29.5 †	37.1	19.4	20.2
L034	GC-23					42.5	26.1	69.5	25.4	32.5	37.1	20.4	19.3
L036	DE-23	50.2	11.5	22.4	35.8	40.5	24.3 †	69.6	24.9	30.2	32.9	19	18.6
L040	DE-23	49.4	10.7 †	21.6	33.3	41.5	26.3	75.2	25.1	31.4	40.7	20.9	20.4
L045	GI-23	50.1	12.1	23.9	34.2	40.8	26.4	68.5	28.1	36.5 †	51.8 †	24.4 †	27.1 †
L064	GJ-11	47.2	11.9	22.8	30.1 †	41.4	27.4	73.7	28.5	32.9	43.6	21.4	23.3
L079	GJ-23	51.4	11.1	21	32.9	43.5	25.7	67.6	27	37.4 †	42.3	20.8	23.2
L080	GJ-13	44.8 †	11.8	20.8	33.8	42.1	25.4	62.4 †	23.9	32.5	39.1	20.8	21.7
L097	DE-23	52.1	12.3	22.2	34.6	41.2	26	71.9	27.1	33.8	47.3 †	21.4	20.6
L133	GG-23	44.9 †	8.98 †	18.1 †	26 †	30.2 †	20.7 †	55.4 †	20.5 †				
L135	DN-23	49.5	12.2	21.7	34.1	42.1	24.7	73.1	28.7	28.2 †	42.6	19.5	19.6
L139	AD-23	55.5 †	11.6	22.6	39 †	44.5	27.6	76.9	29.3	32.5	38.8	20.7	21.7
L142	GJ-13					38.2	24 †	64.3	21.5 †				
L156	GI-24	52.4	14.5 †	25.7 †	40 †	45.6	29.1 †	79.2	32.1 †	45 †	57 †	34 †	36 †
L164	GJ-11	45.6 †	11.5	21.3	33.3	43.1	24.6	73.6	19.8 †	30.7	37.6	19	18.5
L165	GG-23	50.2	9 †	20.3	31.3	40	28	73	28	34	41.3	21	21.2
L178	DE-23	49.3	11.7	21.4	32.8	42.2	25.7	73.8	24.7	32.1	40.9	20.4	20.7
L179	GH-23	58 †	14 †	24	51 †	45.1	30.2 †	76.6	28.5	33.5	37.6	19.2	18.1
L180	ZZ-38									28.9 †	33.3	19.4	16.3

END