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2019

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File: ASPAC Plant Annual Report 2019 draft 26 Feb 2020

Foreword

This ASPAC annual report is the 15th in the upgraded inter-laboratory proficiency program (ILPP) for plant chemical tests, the first of which occurred in 2004-2005.The report covers three rounds each of four specially prepared samples sent to around 44 participants in February, May and August 2019. A similar annual program for soils (reported separately) operated over much the same time period.

The members of ASPAC's LPC, 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 (GPL), our service provider.

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

Department of Environment and Science (DES), Queensland, Australia, commissioned by GPL to confirm that test plant samples were homogenous prior to circulation for proficiency testing purposes, are acknowledged, as are operational staff of GPL.

Membership of ASPAC Laboratory Proficiency Committee 2019

Name	*Location*	*Email*
R.J. Hill (Convenor)	Hamilton, New Zealand	roger.hill@hill-labs.co.nz
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**P Kennelly joined and D.J. Lyons left the LPC at its 1 August 2019 meeting*

Service Provider Details 2019

Name, Street and Postal Address	*Key Personnel & Current Emails.*
Global Proficiency Ltd (GPL)[A].	Lana Pears, Programme Leader – Ag. Programmes. lana.pears@global-proficiency.com
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[A] ***Note:*** GPL, under its "PlantChek" logo, is accredited (Accreditation No. 1) 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

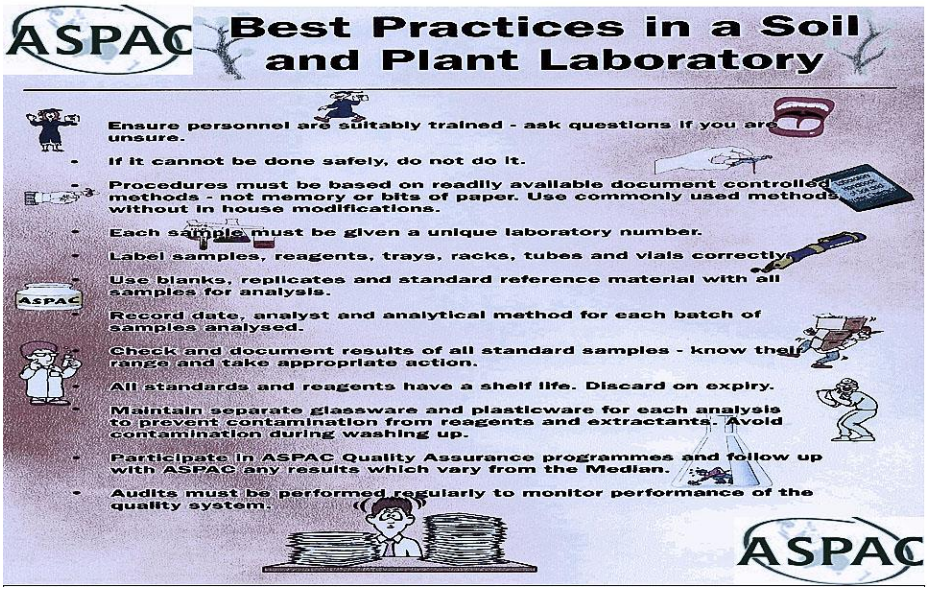
Notes on ASPAC Method-specific Certification: *what it is and what it is not*

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 element/test-specific, as each elemental test is assessed separately using internationally-respected non-parametric statistics. Obviously, the peer review process is strongest for tests with most participants, always ≥7 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 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, the within-laboratory drying, grinding, mixing and sub-sampling of samples, 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 (1993)[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.



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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 2019 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 conducted in February, May and August 2019. For historical details on earlier ILPPs 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, elemental-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

GPL was contracted by ASPAC as the plant ILPP provider for 2019. 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 the 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

Forty-five laboratories [34 from Australia, 1 from Fiji, 1 from Guatemala, 6 from New Zealand, 1 from Papua New Guinea, 1 from the United Arab Emirates and 1 from Uruguay] participated in the ASPAC plant ILPP in 2019, but numbers of reported results varied by "round" and plant test (see Table 1). The counts for each test 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 2019. Participants were invited to analyse each sample using methods normally employed in their laboratory. Tests commonly performed are documented in Table 1. Laboratories were not required to submit results for every one of these tests, although a minimum of seven 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" (see section 2.6). For 14 of the 22 plant tests, the population average concentration for a given element was greater than corresponding medians (average values not presented), for 5 tests (C, P, K, Si and S) median and average values were the same, while for the other test (Fe) the average was less than the median. Moreover, 5 grand median concentrations were lower than their 2018 counterparts, 5 were much the same, and 12 were higher.

Table 1. Plant tests, elemental symbols, units, the arithmetic average numbers of results per round submitted by participating laboratories in the ASPAC 2019 Plant ILPP, plus the concentration ranges and the final grand median concentration for all 22 tests.

2019 Plant tests	Symbol	Units	Average Number of participants			Concentration ranges (final) by test across 12 samples, as reported by labs		
			Feb 19	May 19	Aug 19	Minimum	Median	Maximum
Aluminium	Al	mg/kg	28	27	29	1.6	106.3	524.0
Boron	B	mg/kg	34	33	35	1.1	35.0	80.2
Cadmium	Cd	µg/kg	19	16	19	1.5	13.0	406.0
Calcium	Ca	%	39	36	41	0.05	0.8	3.0
Carbon	C	%	26	26	26	40.2	44.9	51.7
Chloride	Cl	mg/kg	20	20	21	334	2720	17600
Cobalt	Co	µg/kg	20	21	22	21.1	136	1540
Copper	Cu	mg/kg	39	35	39	2.7	8.0	134.0
Iron	Fe	mg/kg	38	35	39	33.7	207.5	423.0
Lead	Pb	µg/kg	16	15	19	4.6	126.5	397.0
Magnesium	Mg	%	39	36	41	0.1	0.3	1.2
Manganese	Mn	mg/kg	38	35	40	13.6	44.6	294.0
Molybdenum	Mo	µg/kg	23	23	23	60.4	296	6010
Nitrate-N	NO_3-N	mg/kg	39	35	36	2.4	7.5	3390
Nitrogen	N	%	17	15	18	1.0	2.2	3.8
Phosphorus	P	%	39	36	40	0.1	0.2	0.5
Potassium	K	%	39	36	40	0.4	1.5	4.8
Selenium	Se	µg/kg	18	18	19	11.3	80.0	651
Silicon	Si	%	8	9	10	0.00	0.05	0.1
Sodium	Na	mg/kg	34	34	37	25.9	249	13700
Sulfur	S	%	35	33	35	0.1	0.2	0.5
Zinc	Zn	mg/kg	38	35	40	8.5	23.1	46.4

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.

The 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 "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 laboratory that was accredited to ISO 17025 standard.

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 summarized 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 2019 program were distributed and coded as follows: February 2019: ASP 1902-1 to 1902-4; May 2019: ASP 1905-1 to 1905-4 and August 2019: ASP 1908-1 to 1908-4. The first 2 digits refer to the year in which the "round" took place, the next 2 digits to the month of that year, and the final digit to 1 of the 4 samples per round. The association between sample code and sample type is provided in Table 2. Eleven of the 12 plant test samples were sourced from Australia, and one came from New Zealand.

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[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.

Table 2. Sample identification and the origin of the samples included in the 2019 ASPAC plant ILPP.

Sample ID	*Round ID*	*Sample Type*	*Origin*
ASP 1902-1	**2**	Wholegrain Oats	AUS
ASP 1902-2		Citrus Leaves (Orange)	AUS
ASP 1902-3		Pea Straw	AUS
ASP 1902-4		Wheat Chaff	AUS
ASP 1905-1	**5**	Weeping Elm	NZ
ASP 1905-2		Grass Hay (Southern)	AUS
ASP 1905-3		Citrus Leaves	AUS
ASP 1905-4		Lucerne Chaff	AUS
ASP 1908-1	**8**	Capsicum	AUS
ASP 1908-2		Chickpeas	AUS
ASP 1908-3		Clover	AUS
ASP 1908-4		Blueberry Leaves	AUS

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. From the beginning of 2015, laboratories were able to submit results electronically, as .csv files, for direct transfer to the database. Checks were still made of data loaded in this way. 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 seven 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 those trace metals reported in mg/kg, while two decimal places were accepted for other tests, rather than to three significant figures. However, the program (like others internationally) did not accept a zero value nor 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 either report the raw concentration readout from the instrument in absolute terms or a value half way between that value and zero. For high values, it was expected that plant digests would be suitably diluted.

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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.)

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, newsletters from GPL were sent to all participating laboratories. Their main purpose was to assist in the interpretation of interim reports. Also included in GPL’s newsletters was information about upcoming events and operational administration of the program.

Laboratories that participated in the 2019 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 confidential laboratory code number was included.

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 equal 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 also for the "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 12-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 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 2019.

Finally, if less than seven 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 was not the case in 2019.

No certification was provided for the (total) plant Si test because the LPC determined that laboratories using digestion procedures could not possibly be getting all plant Si into solution because Si is mostly insoluble in digestion acids except hydrofluoric acid. Very few laboratories currently use methods that are able to determine true total Si (e.g. acid digests that include HF, X-Ray Fluorescence Spectroscopy, Neutron Activation Analysis and Alkaline Fusion techniques).

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 2019 Plant program remained valid until superseded by findings from the following Plant ILPP.

3. Summary Statistics

This section provides summary information and data (sometimes rounded only for table formatting purposes) on a test-by-test basis (in alphabetical order) for each of the 12 samples used across the three rounds in 2019. 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.

2019: Aluminium (mg Al/kg)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	27	28	28	28	27	27	27	27	29	28	29	29
Minimum i	0.1	133	78.3	65.9	52.2	18.5	13.3	293	61	3.72	191	136
Maximum i	24.2	379	311	277	87.4	64.6	147	547	187	8.21	730	549
Median i	1.79	314	243	96.8	70.1	44.8	46.9	417	115	5.62	523	333
Mean i	3.09	302	230	102	70.4	43.8	49.6	409	116	5.73	510	339
MAD i	0.69	31.5	28	15.4	5.7	6.5	9.5	30	12	0.825	82	56
IQR i	1.08	64.5	50.3	29.6	11.2	12.1	17.5	57	23	1.7	143	117
Robust CV% i	45	15	15	23	12	20	28	10	15	22	20	26
Median f	1.59	325	246	95.5	70.1	45.1	46.9	422	117	5.62	524	333
Mean f	1.51	324	247	95.5	70.4	45	47.2	413	118	5.73	533	338
MAD f	0.36	29.5	14	14.5	5.7	4.8	9.4	24.5	6	0.825	62	56
IQR f	0.77	59.3	30.5	27.9	11.2	9.7	16.9	53	12.5	1.7	134	112
Robust CV% f	36	14	9	22	12	16	27	9	8	22	19	25
Outliers	3	3	3	1	0	2	2	3	5	0	2	2
Stragglers	3	1	2	0	0	1	0	0	5	0	0	0

2019: Boron (mg B/kg)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	34	34	34	34	33	32	33	33	35	34	35	35
Minimum i	0.1	68.6	14.3	1.1	44.3	7.23	27.6	2.39	40.2	3.12	30.5	54.5
Maximum i	22.8	137	124	87.6	76.2	18.4	78.8	36.2	63.2	21	59.4	83.3
Median i	1.37	80.2	22.9	7.98	60.3	11.1	67.5	13.4	52.5	12	47	70.4
Mean i	2.83	81.6	27	11.7	59.9	11.6	65.9	14.1	51.6	12	46	70.6
MAD i	0.365	3.6	1.7	0.805	2.7	0.8	2.6	0.9	2	0.85	2.9	4.6
IQR i	1.41	7.43	3.2	1.55	5.3	1.58	4.6	2.2	4.9	1.38	6.35	7.85
Robust CV% i	76	7	10	14	7	11	5	12	7	9	10	8
Median f	1.11	80.2	22.9	8.06	60.4	10.9	67.8	13.1	53	11.9	47.1	71.8
Mean f	1.19	79.9	23	7.97	60.3	10.9	67.9	13.3	52.8	11.7	46.9	72.1
MAD f	0.23	3.5	1.3	0.75	2.55	0.6	2.2	0.6	1.05	0.5	2.5	3.6
IQR f	0.43	6.5	2.35	1.24	5.1	1.18	3.5	0.9	1.93	1.2	5	6.8
Robust CV% f	29	6	8	11	6	8	4	5	3	8	8	7
Outliers	9	1	3	6	3	5	5	5	6	5	4	2
Stragglers	2	0	1	1	0	1	1	5	5	1	0	1

2019: Cadmium (µg Cd/kg)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	18	18	19	19	16	16	16	16	20	18	20	19
Minimum i	2.93	0.0338	82	103	7	15	1.2	124	254	0.986	234	3.56
Maximum i	84	70	262	317	20.9	28.5	26.8	172	459	90.9	302	116
Median i	4.5	1.95	235	249	8.57	16.7	2.11	144	410	3.7	277	7.07
Mean i	11.8	10.4	225	244	10.2	18.4	5.59	144	392	12.8	267	21.9
MAD i	0.82	0.53	9	12	1.01	0.8	0.41	6	14.5	0.5	11.5	1.26
IQR i	2.07	4.08	27.5	30	2.2	1.85	1.92	15.5	33.8	2.57	30	14.5
Robust CV% i	34	155	9	9	19	8	67	8	6	51	8	152
Median f	4.5	1.95	235	249	8.57	16.7	2.11	144	410	3.7	277	7.07
Mean f	4.55	1.51	236	251	9.2	16.7	2.08	142	406	3.69	269	6.55
MAD f	0.82	0.53	9	12	1.01	0.8	0.41	6	14.5	0.5	11.5	1.26
IQR f	1.62	0.59	21	22.8	1.86	1.3	0.388	14	33	0.795	27.5	2.51
Robust CV% f	27	22	7	7	16	6	14	7	6	16	7	26
Outliers	4	8	2	3	2	3	6	1	3	7	1	6
Stragglers	0	0	0	0	0	0	0	0	0	0	0	0

2019: Calcium (%Ca)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	39	39	39	39	36	36	36	36	41	41	41	41
Minimum i	0.02	0.636	0.415	0.0548	0.794	0.173	1.3	0.335	1.95	0.13	0.917	0.33
Maximum i	0.148	3.39	2.75	2.79	2.53	0.382	2.81	0.701	2.86	0.223	1.64	0.622
Median i	0.046	3	1.01	0.084	2.27	0.317	2.46	0.63	2.25	0.147	1.05	0.406
Mean i	0.0491	2.85	1.02	0.154	2.2	0.312	2.43	0.621	2.26	0.151	1.07	0.408
MAD i	0.0025	0.15	0.048	0.008	0.09	0.008	0.09	0.0255	0.09	0.007	0.04	0.016
IQR i	0.0057	0.27	0.079	0.0146	0.175	0.0163	0.163	0.0445	0.17	0.014	0.07	0.031
Robust CV% i	9	7	6	13	6	4	5	5	6	7	5	6
Median f	0.0455	3.01	1.01	0.0836	2.27	0.317	2.45	0.637	2.24	0.146	1.05	0.402
Mean f	0.0458	2.99	1.01	0.0849	2.27	0.316	2.45	0.638	2.24	0.147	1.04	0.401
MAD f	0.0015	0.14	0.03	0.0064	0.08	0.007	0.07	0.02	0.08	0.0045	0.03	0.01
IQR f	0.00285	0.28	0.056	0.0108	0.155	0.0118	0.125	0.041	0.15	0.00925	0.065	0.02
Robust CV% f	5	7	4	10	5	3	4	5	5	5	5	4
Outliers	7	3	7	3	3	7	5	3	3	4	5	6
Stragglers	2	0	1	2	1	1	0	0	1	1	1	2

2019: Carbon (%C)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	26	26	26	26	26	26	26	26	26	26	26	26
Minimum i	42.8	41.6	40.8	43.1	2.76	1.64	2.13	1.65	36.9	41.4	41.8	47.8
Maximum i	47.8	46	46.6	47.7	43.2	43.8	44.8	44.4	41.1	47	45.8	52.3
Median i	46.6	44.4	45.6	46.3	42.3	43	44.1	43.6	40.2	45.5	45.1	51.6
Mean i	46.6	44.3	45.1	46.2	40.4	40.8	42.1	41.5	39.8	45	44.6	51.1
MAD i	0.35	0.4	0.35	0.3	0.55	0.35	0.3	0.35	0.3	0.45	0.45	0.35
IQR i	0.75	0.875	0.65	0.575	1.35	1.35	1.08	1.2	0.875	1.03	1.18	0.9
Robust CV% 1	1	1	1	1	2	2	2	2	2	2	2	1
Median f	46.7	44.4	45.7	46.3	42.5	43.1	44.2	43.7	40.2	45.7	45.3	51.7
Mean f	46.8	44.4	45.7	46.3	42.4	43.1	44.2	43.7	40.2	45.5	45.1	51.7
MAD f	0.35	0.4	0.4	0.3	0.3	0.2	0.2	0.15	0.2	0.3	0.25	0.25
IQR f	0.65	0.75	0.6	0.5	0.55	0.375	0.4	0.3	0.25	0.725	0.8	0.525
Robust CV% f	1	1	1	1	1	1	1	1	0	1	1	1
Outliers	2	3	5	4	4	7	6	6	5	5	5	4
Stragglers	0	0	0	1	2	1	1	4	3	2	1	2

2019: Chloride (mg Cl/kg)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	20	20	20	20	20	20	20	20	21	21	21	21
Minimum i	0.115	0.47	0.37	0.82	0.29	0.49	0.27	0.37	3650	533	4550	60
Maximum i	1860	3460	2980	8190	4840	19300	4260	9000	10100	5070	14100	1200
Median i	536	1120	1540	6200	3770	17400	1760	8100	7020	1570	9160	383
Mean i	675	1540	1800	5860	3510	15900	2030	7500	6950	1720	8850	495
MAD i	78	301	180	325	325	700	400	385	390	130	420	117
IQR i	167	1130	865	685	545	2580	695	808	710	220	550	288
Robust CV% i	23	75	42	8	11	11	29	7	7	10	4	56
Median f	509	1080	1500	6260	3800	17600	1640	8250	7010	1540	9200	334
Mean f	499	1120	1480	6240	3690	17500	1690	8240	7010	1530	9260	354
MAD f	48	70	20	190	230	300	340	255	120	100	210	77.5
IQR f	89.3	173	40	368	460	600	565	478	195	170	285	149
Robust CV% f	13	12	2	4	9	3	26	4	2	8	2	33
Outliers	5	6	8	5	2	5	4	4	5	4	4	3
Stragglers	1	2	3	1	1	2	1	0	4	0	2	2

2019: Cobalt (µg Co/kg)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	19	20	20	20	21	21	21	21	23	22	23	21
Minimum i	16.8	28	63.9	65.9	5	416	0.915	166	1030	36.3	222	61
Maximum i	955	3350	3360	1620	4940	5070	4790	6160	1830	218	523	137
Median i	21.1	78.8	118	213	30.9	621	48.1	403	1540	153	385	74.6
Mean i	72.9	249	290	325	268	853	274	701	1470	151	370	79.8
MAD i	1.1	9.1	7.5	25	2.4	18.5	7.4	18	40	4	6	2.5
IQR i	6.7	21.5	26.3	49.3	10.2	44	14.9	66	150	12.5	41	8
Robust CV% i	24	20	17	17	24	5	23	12	7	6	8	8
Median f	21.1	78.8	118	213	30.9	621	48.1	403	1540	153	385	74.6
Mean f	21.2	77.3	116	212	30.7	617	47.5	406	1540	152	387	74.2
MAD f	1.1	9.1	7.5	25	2.4	18.5	7.4	18	40	4	6	2.5
IQR f	1.75	15.8	10.5	36	3.98	27.8	10.8	36	100	6.25	12.3	6.4
Robust CV% f	6	15	7	13	10	3	17	7	5	3	2	6
Outliers	7	5	6	5	7	5	5	4	6	8	7	4
Stragglers	0	0	0	0	0	0	0	0	0	0	0	0

2019: Copper (mg Cu/kg)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	39	39	39	39	35	35	35	35	39	39	39	39
Minimum i	1.1	89.1	0.582	28.1	5.16	2.63	7.12	9.76	106	2	8.45	2.82
Maximum i	49.8	150	92.6	94.8	13.4	10.5	13.9	16.9	167	10.8	16.2	8.49
Median i	5.12	130	2.75	33.1	7.23	4.82	8.86	11.5	133	4.25	11.3	5.94
Mean i	6.36	127	5.31	35	7.48	5	9.09	11.9	132	4.51	11.4	5.83
MAD i	0.46	6	0.35	1.7	0.49	0.32	0.62	0.6	6	0.32	0.6	0.35
IQR i	0.905	15	0.665	3.3	0.975	0.575	1.2	1.25	11	0.6	1.1	0.675
Robust CV% i	13	9	18	7	10	9	10	8	6	10	7	8
Median f	5.1	131	2.65	32.7	7.23	4.82	8.75	11.3	134	4.25	11.3	5.97
Mean f	5.12	129	2.69	32.8	7.18	4.86	8.81	11.3	135	4.3	11.3	5.94
MAD f	0.4	5	0.33	1.6	0.4	0.2	0.56	0.5	5	0.23	0.5	0.25
IQR f	0.655	12	0.6	2.95	0.845	0.44	1.13	0.95	9	0.42	0.975	0.535
Robust CV% f	10	7	17	7	9	7	10	6	5	7	6	7
Outliers	8	3	4	4	4	6	3	5	5	7	5	7
Stragglers	0	3	2	0	0	2	0	0	1	1	0	1

2019: Iron (mg Fe/kg)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	38	38	37	38	35	35	35	35	39	39	39	39
Minimum i	28.8	154	172	40.3	78.2	54.9	51.2	248	162	21.5	299	152
Maximum i	82	274	2490	326	358	79.6	89.5	402	339	68.9	557	301
Median i	34.9	206	285	212	98	69.2	71.3	340	255	46.9	417	207
Mean i	39.2	202	388	210	105	68.4	71.3	336	255	47.2	418	207
MAD i	2.25	10.5	36	26.5	3.3	4	2.7	16	16	1.9	23	14
IQR i	8.35	29	94	53.3	6.9	7.7	5.15	32	35.5	3.75	44.5	26.5
Robust CV% i	18	10	24	19	5	8	5	7	10	6	8	9
Median f	33.7	208	273	208	97.5	69.4	71.6	343	256	46.9	423	207
Mean f	33.7	205	281	206	97.2	70	71.7	343	259	47	425	205
MAD f	1	7.5	25	22.5	2.35	3.3	2.35	12.5	14	1.6	16.5	13
IQR f	1.78	17.3	45	49.5	4.03	6.2	4.6	23.3	25	2.8	29.3	22
Robust CV% f	4	6	12	18	3	7	5	5	7	4	5	8
Outliers	9	8	4	4	8	3	5	6	5	7	6	3
Stragglers	5	2	4	0	3	1	0	1	1	1	3	1

2019: Lead (µgPb/kg)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	16	16	16	16	15	15	15	15	19	17	19	19
Minimum i	1	91	129	107	230	24.8	77	135	42.6	0.1	218	109
Maximum i	130	336	364	382	540	882	399	362	2640	2550	3080	2410
Median i	4.62	113	163	140	277	35.6	89.3	147	58.2	5.15	397	150
Mean i	28.7	142	197	176	303	110	135	179	220	181	533	285
MAD i	3.29	3	5	18.5	15	2.1	7.25	9	4.2	3.65	11	10
IQR i	22	15.8	39	59	37.5	17.1	47.9	24.5	18.1	16	47.5	25
Robust CV% i	354	10	18	31	10	36	40	12	23	230	9	12
Median f	4.62	113	163	140	277	35.6	89.3	147	58.2	5.15	397	150
Mean f	6.66	111	163	144	268	35.3	91.6	150	59.5	6.02	395	156
MAD f	3.29	3	5	18.5	15	2.1	7.25	9	4.2	3.65	11	10
IQR f	7.99	4.5	9	38	37	3.1	15.5	18.3	7.6	7.86	25	25
Robust CV% f	128	3	4	20	10	6	13	9	10	113	5	12
Outliers	4	6	5	3	2	6	4	3	6	5	5	3
Stragglers	0	0	0	0	0	0	0	0	0	0	0	0

2019: Magnesium (%Mg)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	39	39	39	39	36	36	36	36	41	41	41	41
Minimum i	0.07	0.226	0.2	0.227	0.258	0.174	0.37	0.171	0.1	0.108	0.23	0.16
Maximum i	0.143	0.31	0.337	0.346	94.7	0.265	0.615	0.285	1.38	12	0.376	0.269
Median i	0.115	0.274	0.302	0.293	0.372	0.228	0.506	0.234	1.19	0.131	0.291	0.192
Mean i	0.114	0.274	0.298	0.291	3.1	0.224	0.504	0.233	1.17	0.421	0.293	0.192
MAD i	0.005	0.011	0.012	0.009	0.014	0.008	0.0245	0.008	0.07	0.007	0.013	0.007
IQR i	0.011	0.0205	0.023	0.02	0.0255	0.0153	0.0478	0.0153	0.14	0.012	0.026	0.017
Robust CV% i	7	6	6	5	5	5	7	5	9	7	7	7
Median f	0.115	0.274	0.304	0.295	0.371	0.228	0.506	0.234	1.19	0.13	0.291	0.192
Mean f	0.115	0.274	0.305	0.294	0.372	0.227	0.509	0.233	1.21	0.131	0.292	0.19
MAD f	0.005	0.01	0.012	0.005	0.013	0.0075	0.022	0.0065	0.06	0.007	0.0115	0.006
IQR f	0.0095	0.02	0.0235	0.01	0.0235	0.0128	0.045	0.0133	0.13	0.012	0.024	0.0155
Robust CV% f	6	5	6	3	5	4	7	4	8	7	6	6
Outliers	4	1	4	5	5	4	3	6	1	4	2	6
Stragglers	0	1	0	5	0	0	0	2	1	0	1	0

2019: Manganese (mg Mn/kg)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	38	38	38	38	35	35	35	35	40	40	40	40
Minimum i	27.5	15.2	29.5	29.7	34.5	44.7	10.2	33.4	40	17.8	28	252
Maximum i	52.9	36.7	60.5	70.1	48.3	63.2	24.1	43.8	167	25	49.4	440
Median i	44.3	28.3	47.1	55.5	44.4	57	13.5	38.8	140	20.8	43.5	293
Mean i	43.6	27.7	46.1	54.2	43.7	55	13.4	38.2	138	20.8	43.3	295
MAD i	1.35	1.1	1.8	2.25	1.6	2.2	0.8	1.5	7	0.85	2.15	9
IQR i	2.6	2.1	3.7	4.48	3.05	5.45	1.55	3.35	13.8	1.45	3.98	17.5
Robust CV% i	4	6	6	6	5	7	9	6	7	5	7	4
Median f	44.4	28.5	47.5	55.6	44.8	57.4	13.6	39.1	140	20.8	43.6	294
Mean f	44.5	28.5	47.4	55.6	44.5	57.1	13.5	38.6	141	20.7	43.7	294
MAD f	1	0.95	0.95	2	1.2	0.8	0.65	1.15	6	0.8	2.2	6
IQR f	2	1.8	1.93	4	2.35	1.7	1.33	2.25	11	1.3	3.75	12.5
Robust CV% f	3	5	3	5	4	2	7	4	6	5	6	3
Outliers	7	6	10	5	3	5	5	3	3	3	1	6
Stragglers	2	2	4	0	1	6	0	2	0	0	0	3

2019: Molybdenum (µg Mo/kg)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	24	23	22	23	23	23	23	23	23	23	23	23
Minimum i	220	54.6	10	64.5	93.8	79.9	61.4	197	5020	840	179	960
Maximum i	1120	288	210	402	253	437	267	1600	10500	1480	1820	1970
Median i	254	185	60.4	288	182	304	226	1330	6010	890	309	1040
Mean i	319	177	68.9	281	185	282	207	1220	6360	959	397	1100
MAD i	8	8.5	11.5	6.5	5	10	7	50	170	35	8	20
IQR i	25.8	39.5	28	32	27	38	27.5	155	965	120	38.5	75
Robust CV% i	8	16	34	8	11	9	9	9	12	10	9	5
Median f	254	185	60.4	288	182	304	226	1330	6010	890	309	1040
Mean f	256	184	61.4	288	184	306	228	1330	5910	890	309	1030
MAD f	8	8.5	11.5	6.5	5	10	7	50	170	35	8	20
IQR f	19.8	13	16.8	8	8.5	13.5	16.8	70	360	55.8	10	57.5
Robust CV% f	6	5	21	2	3	3	5	4	4	5	2	4
Outliers	6	10	3	10	9	9	7	6	8	5	10	5
Stragglers	0	0	0	0	0	0	0	0	0	0	0	0

2019: Nitrate-nitrogen (mg NO_3-N/kg)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	17	17	17	17	16	15	15	15	19	18	18	18
Minimum i	0.001	0.001	0.001	0.001	11.8	0.545	30	25	2510	0.5	5.1	0.5
Maximum i	104	93.3	58.7	74.5	62.5	60	95.9	82.5	3720	78.7	74.7	33.9
Median i	6.37	11.1	7.39	6.7	20.5	5.87	65.2	49	3390	3.84	10	3.86
Mean i	18.9	19.3	13	16.1	25.7	11.3	66.3	52.4	3320	12	15.3	7.46
MAD i	3.37	4.52	4.39	3.26	4.45	1.87	9	9.4	110	1.98	2.65	2.32
IQR i	6.3	7.6	7.78	5.59	9.2	4.56	17	15	245	3.92	4.48	4.73
Robust CV% i	73	51	78	62	33	58	19	23	5	76	33	91
Median f	5.01	10.4	6.12	4.83	19.9	5.12	67.7	49	3390	2.38	8.97	2.96
Mean f	4.58	10.1	6.57	5.07	20.5	4.96	68.9	52.4	3370	3.06	8.56	3.32
MAD f	2.01	3.46	4.03	1.87	3.65	1.56	8.1	9.4	105	1.41	2.2	1.2
IQR f	4.62	5.69	7.32	4.21	6.98	2.86	15.4	15	205	2.53	4.35	2.3
Robust CV% f	68	41	89	65	26	41	17	23	4	79	36	58
Outliers	4	3	3	4	2	3	1	0	1	3	4	3
Stragglers	0	0	0	0	0	0	0	0	0	1	0	1

2019: Nitrogen (%N)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	39	39	39	39	35	35	35	35	36	36	36	36
Minimum i	1.87	0.257	0.75	3.04	2.45	1.44	1.92	1.45	3.28	3.35	2.45	1.64
Maximum i	2.22	2.45	1.31	3.65	42.9	43.3	44.4	43.8	3.85	3.88	3.01	2.13
Median i	2.1	2.33	0.994	3.47	2.71	1.63	2.1	1.63	3.74	3.71	2.8	1.99
Mean i	2.1	2.26	1	3.45	3.84	2.81	3.31	2.83	3.69	3.69	2.77	1.99
MAD i	0.04	0.05	0.052	0.06	0.05	0.05	0.04	0.06	0.08	0.075	0.055	0.05
IQR i	0.07	0.1	0.112	0.125	0.11	0.11	0.085	0.105	0.155	0.145	0.105	0.085
Robust CV% i	2	3	8	3	3	5	3	5	3	3	3	3
Median f	2.11	2.34	0.993	3.48	2.71	1.61	2.1	1.63	3.75	3.71	2.8	1.99
Mean f	2.11	2.34	0.995	3.48	2.71	1.61	2.1	1.63	3.74	3.71	2.79	1.99
MAD f	0.02	0.03	0.0445	0.06	0.05	0.05	0.04	0.04	0.065	0.07	0.05	0.03
IQR f	0.05	0.06	0.0883	0.113	0.09	0.0875	0.08	0.08	0.13	0.123	0.095	0.05
Robust CV% f	2	2	7	2	2	4	3	4	3	2	3	2
Outliers	2	3	3	3	4	3	7	1	4	3	5	2
Stragglers	4	3	0	0	0	2	0	3	1	0	0	7

2019: Phosphorus (%P)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	39	39	38	39	36	36	36	36	40	40	40	40
Minimum i	0.286	0.1	0.05	0.134	0.128	0.146	0.234	0.293	0.213	0.221	0.104	0.112
Maximum i	0.87	0.52	0.16	2.18	0.232	0.247	0.42	0.504	0.399	0.406	0.204	0.204
Median i	0.384	0.161	0.059	0.548	0.177	0.188	0.307	0.386	0.31	0.332	0.13	0.134
Mean i	0.405	0.173	0.0655	0.6	0.175	0.186	0.304	0.385	0.312	0.332	0.133	0.135
MAD i	0.017	0.008	0.003	0.017	0.006	0.007	0.0125	0.012	0.011	0.0105	0.006	0.0055
IQR i	0.03	0.0165	0.00658	0.0385	0.0123	0.0158	0.0248	0.023	0.0215	0.0173	0.0115	0.0105
Robust CV% i	6	8	8	5	5	6	6	4	5	4	7	6
Median f	0.383	0.159	0.0573	0.546	0.178	0.188	0.308	0.386	0.307	0.331	0.13	0.133
Mean f	0.381	0.16	0.0569	0.545	0.177	0.187	0.307	0.385	0.306	0.331	0.129	0.133
MAD f	0.0115	0.007	0.00315	0.014	0.0055	0.007	0.011	0.009	0.0075	0.0025	0.005	0.004
IQR f	0.0208	0.015	0.00645	0.0275	0.0103	0.0125	0.021	0.0165	0.0145	0.0045	0.00975	0.0075
Robust CV% f	4	7	8	4	4	5	5	3	4	1	6	4
Outliers	8	6	6	8	4	4	5	8	6	7	3	3
Stragglers	1	0	0	0	0	0	0	1	2	9	3	3

2019: Potassium (%K)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	38	39	39	39	36	36	36	36	40	40	40	40
Minimum i	0.284	1.42	0.35	1.65	0.174	0.13	0.158	0.188	4.22	0.79	0.243	0.265
Maximum i	0.457	2.07	1.63	2.35	1.96	1.79	2.01	2.24	6.07	1.21	0.565	0.85
Median i	0.37	1.74	0.529	1.94	1.47	1.51	1.61	1.83	4.85	0.93	0.41	0.62
Mean i	0.369	1.73	0.553	1.95	1.44	1.46	1.58	1.8	4.84	0.928	0.41	0.618
MAD i	0.0155	0.07	0.027	0.07	0.085	0.08	0.085	0.09	0.22	0.0565	0.026	0.034
IQR i	0.0315	0.14	0.0515	0.125	0.163	0.143	0.168	0.193	0.558	0.113	0.0543	0.0673
Robust CV% i	6	6	7	5	8	7	8	8	9	9	10	8
Median f	0.364	1.75	0.529	1.94	1.47	1.51	1.61	1.83	4.83	0.928	0.405	0.617
Mean f	0.362	1.73	0.528	1.94	1.47	1.52	1.61	1.84	4.79	0.921	0.404	0.612
MAD f	0.014	0.055	0.02	0.045	0.07	0.075	0.08	0.08	0.225	0.057	0.023	0.031
IQR f	0.029	0.115	0.04	0.0925	0.145	0.133	0.153	0.18	0.51	0.118	0.0458	0.066
Robust CV% f	6	5	6	4	7	7	7	7	8	9	8	8
Outliers	5	6	4	6	3	4	2	2	2	1	5	4
Stragglers	0	1	1	5	2	0	0	1	0	0	1	1

2019: Selenium (µg Se/kg)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	19	18	18	18	18	18	18	18	20	20	19	18
Minimum i	40	21.8	23.6	103	5.66	25	48.4	70	417	208	32	2
Maximum i	4550	698	758	828	1000	458	910	378	1420	752	551	169
Median i	58.7	82	33.3	124	484	45	95.1	78	651	291	45	11.3
Mean i	362	158	136	233	507	69.7	158	112	705	341	96.4	36
MAD i	3.5	12.7	4.75	9	61	5.9	11.8	5	24	13	4.2	3.14
IQR i	35.7	38.5	21.9	25.8	105	12.7	30.3	21	80.5	61.5	60.6	26.5
Robust CV% i	45	35	49	15	16	21	24	20	9	16	100	174
Median f	58.7	82	33.3	124	484	45	95.1	78	651	291	45	11.3
Mean f	57.7	84.7	33.6	124	482	44.5	96.7	77.5	662	288	43	12
MAD f	3.5	12.7	4.75	9	61	5.9	11.8	5	24	13	4.2	3.14
IQR f	5.4	20.1	8.1	16	90.5	12.1	16.7	7.1	40	21	5.58	3.98
Robust CV% f	7	18	18	10	14	20	13	7	5	5	9	26
Outliers	8	5	5	4	3	2	4	5	7	7	7	6
Stragglers	0	0	0	0	0	0	0	0	0	0	0	0

2019: Silicon (%Si) NOT CERTIFIED

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	8	8	8	8	9	9	9	9	10	9	10	10
Minimum i	0.0098	0.04	0.0314	0.015	0.028	0.007	0.0404	0.011	0.0088	0.00052	0.0101	0.0116
Maximum i	0.0432	0.149	0.284	0.065	2.57	1.15	0.0913	1.26	36.4	9.94	45.3	40.4
Median i	0.015	0.0664	0.0541	0.0207	0.131	0.0973	0.052	0.122	0.0451	0.005	0.0727	0.054
Mean i	0.0199	0.0717	0.0789	0.0282	0.396	0.204	0.0578	0.233	3.68	1.11	4.62	4.1
MAD i	0.002	0.0137	0.0079	0.0027	0.059	0.0309	0.0076	0.0447	0.00875	0.00352	0.0247	0.0217
IQR i	0.00663	0.0218	0.017	0.00903	0.106	0.0616	0.0136	0.0827	0.016	0.013	0.0399	0.0407
Robust CV% i	33	24	23	32	60	47	19	50	26	193	41	56
Median f	0.015	0.0618	0.0522	0.0197	0.12	0.084	0.0485	0.109	0.0422	0.0025	0.0693	0.0525
Mean f	0.0145	0.0606	0.0496	0.0189	0.125	0.0859	0.049	0.105	0.0441	0.0031	0.0576	0.0474
MAD f	0.0005	0.0107	0.0088	0.0013	0.052	0.0225	0.0066	0.0339	0.0058	0.0015	0.0134	0.0102
IQR f	0.0005	0.02	0.0157	0.00335	0.0987	0.048	0.0099	0.0598	0.0088	0.00289	0.0374	0.0215
Robust CV% f	2	24	22	13	61	42	15	41	15	86	40	30
Outliers	2	1	1	2	1	1	2	1	2	2	2	2
Stragglers	1	0	0	0	0	0	0	0	1	1	0	0

2019: Sodium (mg Na/kg)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	33	34	35	35	33	34	34	34	37	37	37	37
Minimum i	0.002	0.01	0.05	0.07	0.007	0.677	0.033	0.207	22	80	10000	184
Maximum i	65.6	189	659	941	6600	7800	444	3420	300	208	16000	315
Median i	25.7	97.1	600	829	68.2	6720	286	2120	70	103	13500	217
Mean i	26.9	97	542	727	276	6260	286	2030	84.6	110	13300	222
MAD i	5.7	12.9	31	33	11.7	365	22.5	150	10.4	6	700	15
IQR i	10.5	22.7	52	68	27.7	718	46	275	21.6	11	1500	29
Robust CV% i	30	17	6	6	30	8	12	10	23	8	8	10
Median f	25.9	97.1	604	830	60	6750	283	2120	68.7	102	13700	215
Mean f	26.6	99.7	601	830	63.4	6700	284	2100	67.2	102	13600	213
MAD f	4	10.6	27	17.5	4.5	290	19.5	100	6.2	3.9	650	12
IQR f	8.18	20.6	45.5	34.3	13.6	630	38.5	235	12.1	6.2	1230	21
Robust CV% f	23	16	6	3	17	7	10	8	13	5	7	7
Outliers	7	5	5	8	7	3	4	3	6	7	4	3
Stragglers	2	1	0	3	3	1	0	1	4	2	1	1

2019: Sulfur (%S)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	35	35	35	35	33	33	33	33	35	35	35	35
Minimum i	0.126	0.138	0.06	0.142	0.112	0.112	0.116	0.111	0.176	0.04	0.125	0.131
Maximum i	0.46	0.63	0.28	0.9	0.232	0.31	1.7	0.42	0.806	0.381	0.61	0.67
Median i	0.18	0.214	0.0863	0.264	0.168	0.183	0.188	0.169	0.518	0.182	0.205	0.246
Mean i	0.191	0.227	0.0979	0.284	0.172	0.189	0.24	0.18	0.52	0.184	0.223	0.265
MAD i	0.01	0.01	0.0053	0.014	0.005	0.008	0.01	0.011	0.024	0.011	0.007	0.008
IQR i	0.02	0.019	0.0095	0.022	0.012	0.017	0.02	0.022	0.034	0.018	0.0135	0.0165
Robust CV% i	8	7	8	6	5	7	8	10	5	7	5	5
Median f	0.179	0.214	0.0847	0.262	0.168	0.182	0.187	0.168	0.514	0.182	0.204	0.245
Mean f	0.18	0.213	0.0845	0.261	0.169	0.18	0.187	0.169	0.511	0.181	0.205	0.245
MAD f	0.0085	0.0065	0.003	0.01	0.004	0.0055	0.0055	0.007	0.01	0.005	0.007	0.005
IQR f	0.0178	0.0108	0.00598	0.02	0.008	0.0103	0.00975	0.0135	0.0245	0.01	0.012	0.011
Robust CV% f	7	4	5	6	4	4	4	6	4	4	4	3
Outliers	3	7	8	6	9	8	6	5	6	3	4	6
Stragglers	2	2	1	0	1	3	3	1	5	5	0	4

2019: Zinc (mg Zn/kg)

Statistical parameters	Plant sample identification and values											
	February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
	ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
No of results	38	37	38	38	35	35	35	35	40	40	40	40
Minimum i	15.5	13.5	5.7	20.2	8.77	8.42	7.48	17.1	13.6	4.2	23.1	37.2
Maximum i	35.2	30.2	20.6	62.9	21.6	18.7	19	28.8	53.4	71	94.9	173
Median i	21.5	22.8	8.73	46.5	15.3	15.3	13.1	23.7	37.7	24	26.6	43.6
Mean i	21.8	22.6	9.67	46.7	15.3	15.1	13.1	23.8	37.4	24.8	28.3	46.3
MAD i	1.65	1.6	0.9	2.65	0.8	0.9	0.8	0.8	1.45	1.1	1.1	1.3
IQR i	3.18	2.8	1.76	4.73	1.45	1.95	1.3	1.6	2.65	2.25	2.23	2.65
Robust CV% i	11	9	15	8	7	9	7	5	5	7	6	5
Median f	21.5	22.5	8.48	46.4	15.3	15.3	13.2	23.7	37.7	24	26.5	43.9
Mean f	21.6	22.3	8.65	46.4	15.3	15.2	13.1	23.8	37.6	23.9	26.4	44
MAD f	1.55	1.4	0.72	1.9	0.5	0.4	0.35	0.4	0.7	0.85	0.9	0.9
IQR f	3.13	1.9	1.47	3.65	1.05	0.7	0.65	0.7	1.38	1.38	1.95	1.7
Robust CV% f	11	6	13	6	5	3	4	2	3	4	5	3
Outliers	2	3	5	6	5	4	6	6	5	4	3	8
Stragglers	0	1	2	1	3	2	5	8	7	2	2	4

4. Comments on Measurement Performance

Full evaluation of measurement performance is beyond the scope of this report. These are typically made at ASPAC Workshops and in other national and international fora. However, a few observations are made here.

The grand median robust % CVs across the 12 samples by test in 2019, after the removal of "outliers" and "stragglers", ranged from 1.0 (for C, also the lowest in 2018) to 41.0 (for NO_3-N, the highest in 2018). Figure 4.1 presents grand median robust %CVs for program years 2019 and 2018. For 12 of the 21 tests there was little relative difference between robust % CVs in the two years, but the CVs for Al, Cd, K and Mg were higher in 2019 than 2018, while the opposite was the case for Cl, Fe, Na, NO3-N, Pb and S.

Robust %CV can be influenced by analyte concentrations. However, for the 2019 Plant Program Year, only the robust %CVs for Cd, Cl, P and Se were influenced by analyte concentrations to any extent (highest %CVs at lowest concentrations), with coefficients of determination (r^2) for separate power functions of 0.55, 0.38, 0.23 and 0.24 respectively.

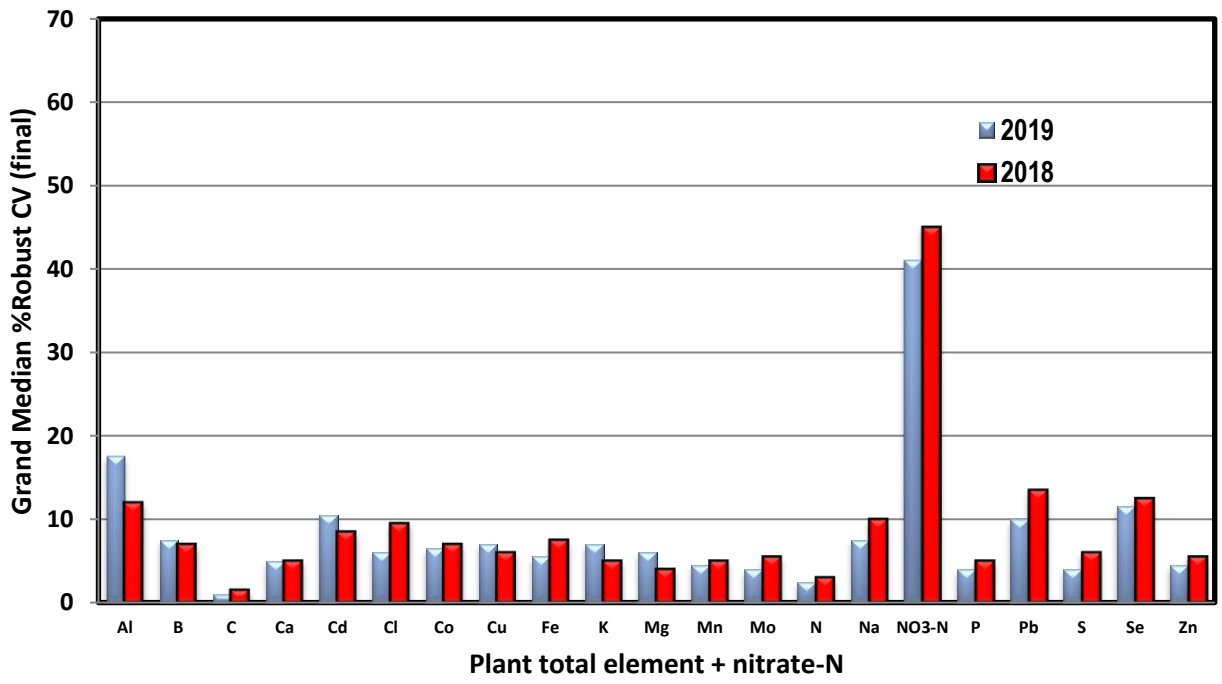

Figure 4.1. Grand median robust %CVs (final) for plant program years 2019 and 2018, excluding plant Si which was not certified in either year.

The sequence for test samples with lowest (best at 5.0%) to highest (worst at 7.0%) grand median %CVs across all 22 tests was (ASP): [1908-1, 1908-2]-2<[1905-2,1905-4]<1908-3<[1902-1,1902-2,1902-4,1905-1]<[1902-3,1905-3,1908-4]. Collectively, the program grand median %CV for the 12 test samples was 6.5% (6.0% in 2018).

Median concentrations of the elements essential for plant growth (Table1) were generally within the bounds expected of healthy plants, with the exception of iron (grand median of 208 mg/kg) and nitrate-N (grand median of 7.5 mg/kg) which respectively were above and below typical plant concentrations. The median nitrate-N value in particular was well below concentrations found in leaf petioles which are often a target sample for nitrate-N. No sample had a median concentration of more than 100 mg/kg; petioles can have concentrations an order of magnitude great than this. Despite the absence of a sample with such a high nitrate-N concentration, this test still returned by far the greatest Grand Median % robust CV (Figure 4.1).

Across all 7696 reported plant test results in 2019, 18.5% were statistically assessed to be “outliers” and 4.3% were assessed to be “stragglers”, which was proportionately more outliers than in 2018 (14.4%), but virtually the same percentage of stragglers (4.4% in 2018). For individual elements, the range of “outliers”, expressed as percentages of the number of reported results for the particular test, ranged from 7.7% (for Al) to 31.9% (Mo), while those for “stragglers” ranged from zero% (Cd, Co, Pb, Mo, Se) to 8.2% (Zn).

Appendix 1: List of laboratories (including contact details at the time) who participated in ASPAC's Plant ILPP in 2019, arranged by country

Name (position)	*Facility*	*Street and/or Postal Address*	*Country*	*Email*
Stephanie King (Administration)	Aglab Services	32 Wattle Avenue, Moolap, Victoria, 3220	Australia	service@agmin.com.au
Craig Newman (Laboratory Manager)	AgVita Analytical	4 Thompson's Road, Latrobe, TAS 7307 PO Box 188, Devonport, TAS 7310	Australia	cnewman@agvita.com.au
Habibur Rahman (Technical Chemist)	Analytical Laboratories and Technical Services Australia (ALTSA)	162 New Guinea Road, Robinvale, Victoria, 3549	Australia	habibur.rahman@altsa.com.au
Tim Thompson (Operations Manager)	APAL Laboratory Pty Ltd	U 3, 11 Ridley Street, Hindmarsh, SA 5007	Australia	tim@apal.com.au
Peter Keating (Managing Director)	Bioscience	488 Nicholson Rd, Forrestdale, WA PO Box 5466, Canning Vale South , WA	Australia	bioscience@biosciencewa.com
Chris Gendle (Chemist)	CSBP Ltd – Soil and Plant	2 Altona St, Bibra Lake, WA 6163	Australia	chris.gendle@csbp.com.au
Nell Peisley (DNA Sequencing Coordinator)	CSIRO Analytical Chemistry Group - Agriculture	Clunies Ross St, Acton, ACT 2601 GPO Box 1600, Canberra, ACT 2601	Australia	nell.peisley@csiro.au
John Gouzos (Manager, Analytical Services)	CSIRO Land and Water, Adelaide	Entrance 4 Waite Rd, Urrbrae, SA 5064 Private Bag 2, Glen Osmond, SA 5064	Australia	John.gouzos@csiro.au
George Croatto (Senior Research Scientist)	DEDJTR Macleod Chemistry Laboratory	TER 4, Ernest Jones Dr, Macleod, VIC 3085	Australia	George.Croatto@ecodev.vic.gov.au
Rob DeHayr (Manager)	Dept of Environment and Science – Chemistry Centre	Block A - Level 3, 41 Boggo Road, Joe Baker Street, Loading Dock 3, Dutton Park, QLD 4102 Business Unit (ESP), GPO Box 2454, Brisbane, QLD 4001	Australia	rob.dehayr@des.qld.gov.au
Subashini Munasinghe (Strategic Project and Technical Manager)	Dual Chelate Fertilizer Pty Ltd	162 New Guinea Road, Robinvale, Victoria, 3549	Australia	suba@dualchelate.com
Michael Smirk (Analytical Chemist)	Earth and Environment Analysis Laboratory (UWA)	University of Western Australia, 35 Stirling Highway, Crawley, WA 6009	Australia	Michael.Smirk@uwa.edu.au
Stephanie Cameron (Operations Manager)	East West EnviroAg	82 Plain St, Tamworth, NSW 2340	Australia	Stephanie.c@eastwestonline.com.au
Graham Lancaster (Laboratory Manager)	Environmental Analysis Laboratory	University Store, Military Road, East Lismore, NSW 2480 PO Box 5125, East Lismore, NSW	Australia	Graham.Lancaster@scu.edu.au
Kellie Taylor (Lab Manager)	EP Analysis	26 Railway Tce, Cummins, SA 5631 PO Box 400, Cummins SA 5631	Australia	info@epanalysis.com.au
James Stangoulis (Associate Professor)	Flinders University Plant Nutrition	Science and Engineering Store, Car Park 9, Physical Sciences Rd, Bedford Park, Adelaide, South Australia 5042	Australia	james.stangoulis@flinders.edu.au
Eva Comino	Inorganic Chemistry Laboratory	Forensic and Scientific Services, 39 Kessels Road, Coopers Plains, Queensland, 4108	Australia	Eva.comino@health.qld.gov.au

Name (position)	*Facility*	*Street and/or Postal Address*	*Country*	*Email*
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Appendix 2: Homogeneity data and statistical assessments* for Total Plant N% (Dumas N) on the 12 test plant samples in 2019.

Sample name		ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
Sub-sample													
1	Rep 1	2.03	2.26	0.963	3.47	2.71	1.55	2.09	1.53	3.64	3.66	2.66	1.92
	Rep 2	2.02	2.25	0.963	3.50	2.74	1.55	2.09	1.55	3.62	3.66	2.69	1.92
2	Rep 1	1.99	2.25	0.980	3.45	2.70	1.54	2.11	1.54	3.64	3.66	2.74	1.91
	Rep 2	2.03	2.27	0.972	3.45	2.74	1.54	2.11	1.55	3.62	3.64	2.72	1.90
3	Rep 1	2.04	2.27	0.943	3.45	2.72	1.56	2.09	1.54	3.65	3.67	2.72	1.92
	Rep 2	2.03	2.26	0.935	3.43	2.74	1.57	2.09	1.55	3.60	3.67	2.73	1.92
4	Rep 1	2.03	2.28	0.987	3.46	2.70	1.53	2.11	1.55	3.64	3.67	2.68	1.92
	Rep 2	2.02	2.29	0.973	3.46	2.74	1.52	2.10	1.55	3.60	3.64	2.68	1.90
5	Rep 1	2.03	2.29	0.938	3.47	2.74	1.55	2.11	1.54	3.63	3.67	2.74	1.92
	Rep 2	2.02	2.29	0.929	3.45	2.74	1.52	2.11	1.54	3.61	3.63	2.72	1.91
6	Rep 1	2.03	2.28	0.975	3.48	2.75	1.53	2.11	1.55	3.64	3.67	2.71	1.92
	Rep 2	2.03	2.28	0.962	3.46	2.74	1.52	2.11	1.55	3.63	3.62	2.71	1.91
7	Rep 1	2.02	2.27	0.944	3.43	2.73	1.56	2.11	1.55	3.66	3.66	2.69	1.91
	Rep 2	2.02	2.29	0.939	3.46	2.69	1.58	2.11	1.55	3.63	3.66	2.69	1.92
8	Rep 1	2.02	2.27	0.961	3.41	2.73	1.54	2.12	1.54	3.63	3.66	2.70	1.91
	Rep 2	2.03	2.31	0.958	3.43	2.73	1.56	2.11	1.55	3.63	3.65	2.71	1.91
9	Rep 1	2.03	2.28	0.950	3.46	2.70	1.53	2.11	1.55	3.65	3.67	2.71	1.91
	Rep 2	2.03	2.28	0.956	3.46	2.73	1.53	2.11	1.54	3.62	3.67	2.72	1.91
10	Rep 1	2.05	2.28	0.935	3.47	2.74	1.60	2.11	1.55	3.63	3.66	2.68	1.91
	Rep 2	2.03	2.28	0.938	3.43	2.73	1.55	2.11	1.57	3.62	3.65	2.69	1.91
Mean		2.03	2.28	0.955	3.45	2.73	1.55	2.11	1.55	3.63	3.66	2.70	1.91
Analytical SD		0.0001	0.0001	0.00003	0.0002	0.0003	0.0002	7.9E-06	5.1E-06	0.0003	0.0003	0.0001	5.7E-05
Sampling SD		0.00003	0.0001	0.0003	0.0002	0	0.0002	7.3E-05	0	0	0	0.0003	0
SD proficiency data		0.042	0.054	0.072	0.091	0.063	0.062	0.055	0.062	0.09	0.09	0.06	0.04
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.

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 7 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; i.e., 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 summarized in Table 3 were calculated on the same populations of data. Only the first (i) 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 2019.

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) 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
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 used 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_2O-acetylene	14
AAS-Flame with deuterium background correction, using N_2O-acetylene	15
AAS-Flame with Zeeman background correction, using N_2O-acetylene	16
AAS-Flame with pulsed hollow cathode lamp background correction, using N_2O-acetylene	17
Chromatography	18
Cold vapour technology	19
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 (e.g.,Leco)	37
Others (specify)	38

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Aluminium (mg/kg)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
22	DE-23	1.79	333	230	103	75.8	53.5	67.5	445	168 ††	6.04	689	490
8888	DE-23	2.48	376	274	112	82.8	58.2	64	448	187 ††		730	549 ††
10156	GI-23	24.2 ††	291	292	277 ††	52.2	30.5	31.3	381	74.8 †	4.96	462	282
10173	DN-24	0.54	329	295	110	68	48.8	51.9	434	173 ††	6.96	634	472
11079	DE-23	4.02 †	372	311 †	139					154 †	5.76	618	399
21043	GJ-23	1.23	302	212	70.2	79.3	60.9	42.2	436	115	4.13	543	424
21088	DE-23	0.95	371	246	118	87.4	53.4	55.8	430	121	8.03	557	372
21100	DE-24	0.568	169 ††	94.4 ††	78.5	55.2	18.5 ††	24.2	298 ††	73.2 ††	4.25	215 ††	177
21178	DE-23	2	310	246	98	68.4	36.7	40.6	363	135	7	510	310
21229	GI-23	0.588	288	233	85.7	72.4	45.3	38.4	460	123	5.91	513	282
21230	DE-23	0.1 †	311	236	84	62.6	34.8	35.6	344	112	5.26	644	477
21232	DE-23	2.91	367	254	105	79.4	51.3	58.2	443	144	8.21	645	490
50004	DE-23	1.82	357	268	116	67.7	47.4	56.4	417	123	4.73	436	303
50005	GJ-23	1.84	288	211	78.3	73.6	64.6 †	67	442	108	7.56	471	389
50011	DE-23	1.59	324	250	107	70.1	44.3	39.5	439	102	5.95	515	325
50012	DN-23	1.97	298	209	90.2	66.3	34.7	40.3	387	130	5.31	491	277
50014	DE-23	1.93	301	234	82.3	85	41	56.3	427	105	4.48	409	241
50017	DE-23	1.67	337	277	95.5	79.8	50.3	57	449	126	7.2	630	465
50018	DE-23	0.836	325	241	106	70.3	44.7	44.1	386	112	5.46	564	328
50020	GI-23		133 ††	78.3 ††	65.9	71	40.9	35.7	410	75.5 †	6.45	351	179
50024	GJ-23	3.2 †	379	234	80.1	78	46.3	56.4	436	109	4.9	524	365
50027	DN-23	1.1	367	278	119	67.2	44.8	47.6	394	117	6	523	333
50029	AD-23	1.87	249	202	74	62.3	41.6	46.9	380	119	5.48	605	339
52283	GJ-23	1.41	231	244	81.2	68.6	40.7	13.3 ††	547 ††	113	5.75	554	340
52491	GI-23	1.33	158 ††	123 ††	71	55.5	21.6 ††	147 ††	293 ††	61 ††	7.3	191 ††	136 ††
52495	GI-24	1.36	209 †	150 †	83.3	64.2	29.6	25	353	81.7 †	4.98	318	172
52565	DE-23	15.9 ††	316	252	104	73.8	46.1	52.2	387	103	3.94	574	374
52610	DE-24									81 †	4.8	385	215
52636	DE-23	4.23 ††	351	260	120	65.2	53	45.3	417	119	3.72	485	318

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Boron (mg/kg)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
22	DE-23	1.01	82	21.4	7.23	64.5	10.6	73.7	13.1	53	12.4	49.5	77.1
8888	DE-23	2.08 †	83.9	22.7	8.18	60.3	10.6	68.7	12.7	55	12.3	48.4	73.5
10156	GI-23	10.4 ††	75.6	73.5 ††	69.6 ††	53.7	10.2	61.4	12.5	46.4 †	11.5	41.9	65.4
10173	DN-24	1.08	80.2	23.4	8.06	58.3	11.2	64.1	13.8	54.5	12.8	48	75.8
11079	DE-23									55.2	9.93	47.1	75.6
20204	GJ-23	1.1	85.3	24.8	8.31	60.9	11.5	75.9	15	46.2 †	11.1	42.6	67.1
21043	GJ-23	5.69 ††	77.4	23.7	10.2	60.8	15.3 ††	70.3	18.9 ††	63.2 ††	16.9 ††	53.5	78.6
21088	DE-23	2.7 ††	86.5	24	9.68	55.9	11.1	62.1	13.3	53	15 ††	50	69
21100	DE-24	1.47	86.2	23.9	9.06	66	11.5	76.1 †	14.1	60.1 ††	15 ††	51.3	83.3
21178	DE-23	1.5	83.2	24.6	9	58	9.77	64.7	12.1	53	12	47	69
21229	GI-23	1.22	86.4	23.1	7.52	62	10.5	65.6	13.1	52.5	12.1	49.8	75.2
21230	DE-23	0.6	68.6	18.5	5.6 †	48.3 ††	7.23 ††	52.4 ††	8.53 ††	47.5 †	10.6	43	68
21232	DE-23	1.71	70.9	19.6	6.77	53.9	9.07	55.6 ††	10.9 †	46.1 †	10.4	41.3	64.9
50004	DE-23	1.19	82.8	22.9	8.79	65.2	10.4	68.3	12.9	51.7	13	48.3	70.4
50005	GJ-23	0.72	72.4	20.9	6.94	58.3	12.3	67.4	15.5 †	44.7 ††	10.6	39.9	64.2
50008	AD-23	1.34	78.3	22.5	7.31	57	10.9	67.5	13.1	44.6 ††	11.9	45.6	70.2
50011	DE-23	1.67	83.3	22.7	7.68	62.8	11.2	69.5	12.9	50.7	11.8	46.6	74.7
50012	DN-23	0.526	80.1	20.7	6.03	60	16.3 ††	68.6	13.8	53.1	13.2	52.3	73.1
50014	DE-23	1.11	80.8	22.8	7.3	66.6	11.5	72.5	13.5	51.8	11.8	46.9	72.6
50017	DE-23	0.986	79.2	22.4	7.18	62.1	11.8	71.2	14.6	53.1	11.4	44.6	69.1
50018	DE-23	1.1	79.7	23.2	7.31	60.4	10.4	67.2	13.7	52.1	12	49.2	74.8
50020	GI-23	2.58 †	86.7	20.9	8.84	66.3	12.3	78.8 ††	15.4 †	53.6	9.98	59.4 ††	68.4
50024	DE-23	1.7	80.1	23.3	8.2	57.9	9.16	66.4	12.1	50.8	12.1	47.1	69.9
50025	GJ-23	8.99 ††	71.8	27.4	14.5 ††	53.3	16.9 ††	68.6	18.4 ††	55	21 ††	49	78
50027	DN-23	1	80.2	22.7	7.9	57.6	10.1	64.9	13	52.1	11.5	45.8	65.1
50029	AD-23	0.788	87.7	24.6	8.48	57.5	11.1	67.8	15	54.1	12.5	49.1	78.3
52283	GJ-23	1.03	85.3	27.2	8.59	61.9	11.9	65.5	13.4	53.3	12.3	50.2	76.4
52384	DE-23	0.1 ††	73.4	17.9 †	1.58 ††								
52491	GI-23	1.71	80.9	22.3	7.04	63	10.3	68.2	12.8	52	11	47	75
52494	GG-23	1.4	76.7	21	7.29	57.5	9.91	65.6	12.2	49.1	11.1	44.1	66.5
52495	GI-24	1.3	85.6	24.8	8.25	64.7	10.9	73.5	13.7	53.8	12.2	50.2	76.2
52508	AE-23	2.86 ††	78	26	8.09	44.3 ††		51.1 ††	2.39 ††	57.9 †	11.7	41.2	69.8
52565	DE-23	6.87 ††	69.9	14.3 ††	1.1 ††	62.7	13.7 †	66	16.3 †	40.2 ††	9.5 †	35.6 ††	54.5 ††
52610	DE-24									56	13.5	43	71
52632	DE-30	22.8 ††	137 ††	124 ††	87.6 ††	76.2 ††	18.4 ††	27.6 ††	36.2 ††	42.5 ††	3.12 ††	30.8 ††	56.9 †
52636	DE-23	3.87 ††	77.9	21.2	1.1 ††	60.2	12.1	68.2	16.1 †	49		30.5 ††	54.5 ††

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Cadmium (µg/kg)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	**ASP 1902-2**	**ASP 1902-3**	**ASP 1902-4**	**ASP 1905-1**	**ASP 1905-2**	**ASP 1905-3**	**ASP 1905-4**	**ASP 1908-1**	**ASP 1908-2**	**ASP 1908-3**	**ASP 1908-4**
22	DE-24	3.79	1.71	229	268	8.16	16.3	2.31	172 ††	446	2.76	287	4.54
10156	GI-23	84 ††	70 ††	82 ††	103 ††					382	90.9 ††	280	93.9 ††
10173	DN-24	3.32	5 ††	243	265	8.31	16.3	1.7	140	459	3.28	277	4.93
11079	DE-23			221	272					400	51 ††	250	55 ††
20204	GJ-23	8.93 ††	6.83 ††	212	221	10.1	28.5 ††	26.8 ††	124	357 ††	10.8 ††	234 ††	23.6 ††
21088	DE-23					20.9 ††	27.5 ††	25.6 ††	133	376	5.69 ††	243	18 ††
21088	DE-23	5.86	20.6 ††	247	254								
21100	DE-24	3.62	1.95	208	237	10.4	20.8 ††	3.67 ††	146	428	0.986 ††	277	3.56
21178	DE-24	5	2	243	256	7	15	3	131	370	4.2	250	6.6
21229	GI-24	4.7	1.42	235	269	8.54	17.9	2.11	144	408	3.9	266	7.72
21230	DE-24	2.93	0.033	226	236	9.93	18	4.53 ††	135	381	3.97	250	8.5
50004	DE-24	3.68	1.39	187 ††	204 ††	13.8 ††	15.4	1.2	144	424	3.7	278	7.4
50005	GJ-23	11.9 ††	4.41 ††	254	272	10.7	16.5	3.75 ††	133	339 ††	4.71	263	116 ††
50011	DE-24	5.29	1.91	245	256	8.04	16	1.87	139	380	3.3	255	6.73
50012	DN-24	6	2	216	210	8	17	2	142	410	25 ††	257	25 ††
50014	DE-24	4.5	2	253	258	11.8	16.7	2.7	150	412	6 ††	289	9.2
50018	DE-24	5.34	6.12 ††	242	246	9.58	18.5	4.31 ††	153	409	5.16	264	7.51
50020	GI-23	43 ††	54 ††	262	317 ††					254 ††		247	
50024	GJ-24	5.5	4.3 ††	226	245	9.6	17.5	2	163	399	2.1	302	5
52495	GI-24	4.22	0.719	253	249	8.57	16.2	1.88	150	415	3.52	288	7.43
52610	DE-24									395		280	6

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Calcium (%w/w)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
22	DE-23	0.048	3.13	0.984	0.086	2.41	0.326	2.8 ††	0.647	2.33	0.157	1.12	0.42
8888	DE-23	0.047	3.16	1.04	0.09	2.35	0.317	2.59	0.625	2.31	0.156	1.08	0.417
10156	GI-23	0.0468	2.68	2.75 ††	2.79 ††	1.99 †	0.317	2.22	0.605	2.12	0.148	1	0.376
10173	DN-24	0.042	2.95	1.04	0.078	2.2	0.34	2.41	0.638	2.53 †	0.144	1.08	0.406
10181	GF-23	0.042	2.9	1.02	0.082	2.44	0.34	2.66	0.661	2.28	0.156	1.08	0.406
11079	DE-23	0.056 ††	3.33	1.21 ††	0.112 ††					2.23	0.163 †	1.07	0.433
20204	GJ-23	0.044	2.79	0.983	0.11 †	2.16	0.382 ††	2.52	0.685	2.16	0.194 ††	1.04	0.46 ††
21043	GJ-23	0.045	2.83	0.955	0.073	2.17	0.3	2.35	0.6	2.37	0.141	0.945	0.389
21088	DE-23	0.0423	3.01	0.96	0.089	2.24	0.321	2.46	0.585	2.22	0.136	1.03	0.371
21100	DE-24	0.0568 ††	3.39	1.11	0.095	2.53	0.367 ††	2.81 ††	0.701	2.43	0.177 ††	1.13	0.421
21178	DE-23	0.044	3.03	1.02	0.08	2.18	0.302	2.44	0.626	2.23	0.13	1.02	0.4
21190	AD-09	0.05	3.07	1.07	0.07	2.27	0.31	2.3	0.601	2.47	0.156	1.19 ††	0.479 ††
21193	GJ-11									2.1	0.15	1.05	0.4
21229	GI-23	0.0457	2.96	1	0.080	2.29	0.318	2.53	0.672	2.24	0.149	1.05	0.412
21230	DE-23	0.0292 ††	2.14 ††	0.719 ††	0.054 ††	1.69 ††	0.223 ††	1.78 ††	0.45 ††	1.97	0.136	0.925 †	0.373
21232	DE-23	0.05	2.84	0.96	0.09	2.34	0.31	2.44	0.64	2.19	0.15	1.03	0.4
21234	GH-09	0.054 †	3.08	1.2 ††	0.097					2.41	0.223 ††	1.64 ††	0.622 ††
50004	DE-23	0.045	3.15	1.03	0.1	2.23	0.323	2.45	0.626	2.52	0.161	1.26 ††	0.447 †
50005	GJ-23	0.0447	3.15	1.08	0.075	2.31	0.318	2.51	0.637	2.33	0.133	1.1	0.425
50008	GJ-23	0.045	3.04	1.03	0.076	2.38	0.309	2.55	0.619	2.28	0.146	1.03	0.397
50011	DE-23	0.047	2.91	0.987	0.08	2.21	0.309	2.43	0.626	2.09	0.144	1.01	0.398
50012	DN-23	0.0435	3.02	0.993	0.085	2.17	0.311	2.41	0.622	2.25	0.148	1.08	0.41
50014	DE-23	0.0407	2.72	0.975	0.075	2.26	0.319	2.47	0.63	2.19	0.142	1.03	0.376
50017	DE-23	0.0474	3.19	1.1	0.095	2.31	0.325	2.58	0.656	2.34	0.16	1.09	0.448 †
50018	DE-23	0.0462	3.01	1.02	0.074	2.27	0.316	2.48	0.641	2.21	0.145	1.06	0.406
50020	GI-23	0.05	2.87	0.77 ††	0.08	2.41	0.32	2.79 ††	0.685	2.39	0.14	0.99	0.33 ††
50024	GJ-23	0.046	3.04	0.973	0.086	2.27	0.321	2.5	0.642	2.17	0.158	1.07	0.409
50025	GJ-23	0.045	2.86	1.01	0.080	2.14	0.296	2.4	0.629	2.28	0.15	1.08	0.422
50027	DN-23	0.0446	3.16	1.01	0.083	2.36	0.312	2.64	0.615	2.25	0.145	0.973	0.406
50029	AD-23	0.0511	3.36	1.14 †	0.092	2.09	0.281 ††	2.4	0.59	2.16	0.154	1.02	0.396
52283	GJ-23	0.046	3.21	1.02	0.091	2.27	0.313	2.37	0.648	2.25	0.143	1.07	0.407
52384	DE-23	0.07 ††	3.02	1.03	0.1								
52387	DE-14	0.052 †	2.72	0.918	0.095	0.794 ††	0.173 ††	1.3 ††	0.335 ††	2.86 ††	0.173 ††	1.39 ††	0.429
52491	GI-23	0.0453	2.93	0.993	0.073	2.35	0.33	2.57	0.67	2.05	0.138	0.988	0.384
52494	GG-23	0.043	2.84	0.962	0.083	2.08	0.294	2.34	0.582	2.15	0.142	1	0.38
52495	GI-24	0.0458	3	1.07	0.084	2.38	0.365 ††	2.59	0.696	2.3	0.145	1.09	0.406
52508	AE-23	0.05	2.71	0.95	0.08	1.93 ††	0.26 ††	2.24	0.51 ††	2.25	0.16	0.97	0.35 ††

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Calcium (%w/w)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	**ASP 1902-2**	**ASP 1902-3**	**ASP 1902-4**	**ASP 1905-1**	**ASP 1905-2**	**ASP 1905-3**	**ASP 1905-4**	**ASP 1908-1**	**ASP 1908-2**	**ASP 1908-3**	**ASP 1908-4**
52565	DE-23	0.148 ††	0.709 ††	0.415 ††	0.097	2.24	0.33	2.4	0.66	2.19	0.147	1.1	0.396
52610	GG-23									1.95 ††	0.14	1.02	0.38
52632	DE-11	0.02 ††	2.6	0.93	0.06 †	2.15	0.309	2.35	0.617	2.1	0.14	0.95	0.39
52636	DE-23	0.055 ††	0.636 ††	0.497 ††	0.087	2.28	0.341 †	2.46	0.671	2.1	0.147	0.917 ††	0.337 ††
52639	DE-38									2.61 ††	0.144	1.07	0.402

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Carbon (%w/w)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
22	CA-37	46.3	44.3	45.8	45.8	42.2	43.1	44.1	43.8	41.1 †	47 †	45.5	51.8
10156	CA-37	46.4	43.9	44.7	46.2	2.76 ††	1.64 ††	2.13 ††	1.65 ††	40.5	46.3	45.6	51.8
10173	CA-37	47.6	44.7	46	46.5	43.2	43.8	44.8	44.4 †	40.4	46.5	45.8	52.2
10181	CA-37	47.8	44.8	46.4	46.6	42.4	42.9	43.8	43.5	40.2	46	45.5	52
20204	CA-37	46.5	44.4	45.3	46.3	42.1	42.7	43.9	43.8	39.7	45.2	44.7	51.6
21100	CA-37	46.6	44.3	45.3	46	42.9	43.3	44.4	43.8	40.2	45.7	45.3	51.7
21229	CA-37	46.8	44.9	45.6	46.8	42.3	42.7	44.1	43.7	40.2	45.5	44.2	51.5
21230	CA-37	47.2	44.4	45.7	46.1	42.7	43.3	44.4	44	39.3 †	45.1	44.6	50.7 †
21232	CA-37	42.8 ††	42.3 ††	40.8 ††	43.1 ††	38 ††	37.6 ††	44	40.3 ††	39.3 †	42.6 ††	43.1 ††	48.2 ††
21232	ZZ-38									38.7 ††	41.5 ††	45.2	51.5
50004	CA-37	46.3	44.1	45.3	46.2	43	43.3	44.2	43.6	40.4	45.9	45.3	51.6
50005	CA-37	46.5	44.8	45.5	46.3	41.9	42.4	44	43.3	40.1	45.3	44.7	51.9
50008	CA-37	46.8	44.3	45.7	46	42.5	43.1	44.1	43.5	40.2	45.6	45.3	51.7
50011	CA-37	46.7	44.8	45.7	46.5	42.3	42.7	44.1	43.5	40	45	44.4	51.4
50012	CA-37	47.8	46 ††	46.5	47.6 ††	42.9	43.6	44.8	44.2 †	40.8	45.9	45.5	52.3
50014	CA-37	47.1	44.6	45.6	46.4	42.7	43.1	44.2	43.6	40.4	45.7	45.4	51.7
50017	CA-37	46.1	43.6	44.1 ††	45.8	41.3	42.2 †	43.1 †	42.6 †	40.4	45.7	45.1	51.3
50018	CA-37	46.5	44	45.3	46	42.3	43.1	44	43.3	40.3	45.7	45.2	51.3
50020	CA-37									36.9 ††	41.4 ††	41.8 ††	47.8 ††
50024	CA-37	47.7	44.9	46.1	46.7	43	43.1	44.5	43.7	40.5	44.9	45.1	52
50029	CA-37	45.5	43.7	42.3 ††	45.3 †	40.5 †	39.9 ††	42 ††	41.2 ††	38.8 ††	44 †	43.3 ††	50.6 †
50032	CA-37	47	44.6	45.9	46.2	40.5 †	40.4 ††	42.2 ††	41.2 ††				
52283	CA-37	46.6	41.6 ††	43 ††	47.7 ††	42.6	43.1	44.5	44	40.2	45.5	45	51.3
52491	CA-37	46.6	44.6	45.2	46.3	41.5	41.6 ††	41.7 ††	42.6 †	39.6	44.8	44.2	51.2
52495	CA-37	46.9	44.9	45.7	46.8	42.3	43	44.2	43.6	40.5	45.9	45.5	51.9
52565	CA-37	45.8	43.9	45.1	45.8	40.1 ††	40.5 ††	41.8 ††	41.3 ††	37.7 ††	42.3 ††	41.9 ††	48.7 ††
52632	CA-37	45.1 ††	43.3	44 ††	45 ††	40.3 ††	41 ††	42.1 ††	41.7 ††	38.4 ††	43.2 ††	42.8 ††	49.6 ††
52636	CA-37	47.8	45.3	46.6	46.8	42.8	43.3	44.6	44	39.5	44.5	43.9 †	50.8

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Chloride (mg/kg)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	**ASP 1902-2**	**ASP 1902-3**	**ASP 1902-4**	**ASP 1905-1**	**ASP 1905-2**	**ASP 1905-3**	**ASP 1905-4**	**ASP 1908-1**	**ASP 1908-2**	**ASP 1908-3**	**ASP 1908-4**
22	BA-32	532	1040	1550	6450	3840	18200	1600	8440	7070	1380	9200	312
10173	BA-27	600	1100	1500	6300					6900	1700	9200	300
20204	BB-27	1180 ††	2110 †	2360 ††	5040 ††	3800	14200 ††	3780 ††	7580	8450 ††	2170 ††	9850	578
21043	BB-31	448	1010	1410	6090	3350	15600 †	1460	7610	6310 †	1440	8100 †	325
21088	BB-31	569	3040 ††	2600 ††	6840	4160	17200	4210 ††	8160	7770 †	1580	9240	792 †
21100	BB-31	1810 ††	3460 ††	2970 ††	6230	3730	12100 ††	3080 †	6210 ††	10100 ††	5070 ††	14100 ††	733 †
21178	BB-28					3400	16600	1300	7900	6600	1400	8700	220
21229	BB-31	406	1100	1480	6170	3570	17700	1640	8380	6970	1590	9160	476
21230	BB-28	540	1050	1740 †	7500 ††	3960	17900	1670	8620	7410	1600	9840	362
21232	BB-31	500	1000	1500	5500	2500 ††	14500 ††	1000	6500 ††	5000 ††	1250	7000 ††	500
50005	BB-32	949 ††	1500	2230 ††	3890 ††	3140	17300	1840	8140	7140	1630	9130	432
50011	BB-31	420	1440	1660 †	5880	3810	18000	2150	8400	6980	1420	8990	383
50012	BB-31	468	1140	1520	6080	4530	17900	2070	8520	7190	1530	8990	277
50014	BB-31	500	1300	1500	6600	4000	19300 †	2000	9000	7900 †	1500	9900	600
50018	BB-32	518	871	1520	6450	3810	18100	1480	8330	7000	1570	9240	342
50020	BA-31	1860 ††	3380 ††	2670 ††	5150 †	3010	14200 ††	2200	5500 ††	3650 ††	533 ††	4550 ††	185
50027	BB-32	380	839	1110 †	6290	3310	17600	1240	8050	7170	1430	9440	60
50029	BB-31	543	2760 ††	2360 ††	6530	4840 †	17400	4260 ††	8730	7660 †	1540	9250	1010 ††
50032	BB-31	720 †	2220 ††	2980 ††	8190 ††								
52494	BA-32	564	510 †	1380	6010	3480	16800	1540	7900	6700	1650	8740	316
52565	BA-31					3860	17400	2160	8010	7020	1840	7930 †	991 ††
52632	BB-31	0.115 ††	0.47 ††	0.37 ††	0.82 ††	0.29 ††	0.49 ††	0.27 ††	0.37 ††	4900 ††	2250 ††	5300 ††	1200 ††

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Cobalt (µg/kg)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	**ASP 1902-2**	**ASP 1902-3**	**ASP 1902-4**	**ASP 1905-1**	**ASP 1905-2**	**ASP 1905-3**	**ASP 1905-4**	**ASP 1908-1**	**ASP 1908-2**	**ASP 1908-3**	**ASP 1908-4**
22	DE-24	20.4	70.6	103	239	10.4 ††	615	34.6	401	1510	147	387	74.6
8888	DE-24		90	130	240	38.4	665	54.5	447	1600	160	385	70.5
10156	GI-23	26.4 ††	59.6	63.9 ††	65.9 ††					1220 ††	122 ††	316 ††	69
10173	DN-24	18.3	97.2	171 ††	264	16.6 ††	591	34.7	380	1580	152	386	77.3
20204	GJ-23					25.2	416 ††	46.1	166 ††	1190 ††	145	290 ††	94.5 ††
21088	DE-23	47 ††	162 ††	223 ††	229	101 ††	618	96.3 ††	456	1430	172 ††	394	122 ††
21100	DE-24	21.3	74.6	111	236	33.7	711 ††	56.4	433	1650	171 ††	390	72.1
21178	DE-24	19	70	105	834 ††	32	601	47	350	1200 ††	120 ††	310 ††	61 ††
21229	GI-24	21.4	53.1	119	201	29.6	599	36.4	375	1500	180 ††	391	76.2
21230	DE-24	29.1 ††	90.2	126	196	49.6 ††	617	60.4	403	1510	156	402	82.4
50004	DE-24	16.8 ††	67	95.7	360 ††	30.8	631	46.5	417	1540	151	399	78.5
50005	GJ-23	21.6	79.4	122	227	27.7	603	41.5	391	1640	170 ††	398	68.8
50011	DE-24	24.5	79.3	128	199	30	575	49.1	381	1560	153	376	73.5
50012	DN-24	20	84	116	224	31	625	53	404	1600	153	381	76
50014	DE-24	20	78.3	120	199	29	638	44	403	1460	155	367	72.7
50018	DE-24	22.2	167 ††	122	178	32.9	615	104 ††	380	1530	154	384	81.3
50020	GI-23	955 ††	3350 ††	3360 ††	1620 ††	28.6	1140 ††	0.915 ††	987 ††	1030 ††		330 ††	
50024	GJ-24	27.4 ††	88.2	113	172	23.3	645	43	416	1570	149	383	72.3
50027	DN-23	29 ††	28 ††	165 ††	183	5 ††	601	5 ††	452	1470	160	336 ††	70
50029	AD-23	24.9	114 ††	195 ††	435 ††	70.6 ††	701 ††	53	509 ††	1830 ††	218 ††	523 ††	137 ††
52495	GI-24	21.1	78.1	116	197	37.9	628	59.4	406	1600	157	397	76.9
52565	DE-23					4940 ††	5070 ††	4790 ††	6160 ††	1190 ††	36.3 ††	222 ††	
52610	DE-24									1450	140	370	70

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Copper (mg/kg)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
22	DE-23	5.01	134	2.75	33.1	7.37	4.84	9.49	12	139	4.54	12.1	6.14
8888	DE-23	5.28	138	3.21	34.8	7.63	5.14	9.5	12.1	144	4.57	12.5	6.22
10156	GI-23	4.61	89.1 ††	92.6 ††	94.8 ††	7.22	4.71	8.73	11.3	107 ††	3.9	9.85	5.38
10173	DN-24	4.7	115	2.65	33.8	5.16 ††	5.1	7.12	11.7	146	4.37	12.3	6.13
11079	DE-23	5.57	150 ††	3.87 †	41.5 ††					139	4.25	11.6	5.97
20204	GJ-23	9.26 ††	120	0.582 ††	36	7.51	5.5	11.3 ††	14.8 ††	116 †	9.16 ††	8.94 ††	4.86 †
21043	GJ-23	4.64	117	2.2	30.8	6.87	4.6	8.29	11.1	132	4.02	10	5.56
21088	DE-23	5.53	143	3.14	36.4	8.09	5.39	9.32	15 ††	144	4.15	11.8	6
21100	DE-24	5.57	139	2.9	35.9	8.23	5.36	9.79	12.6	138	4.55	11.7	6.29
21178	DE-23	5.1	136	2.6	34.4	7.22	4.88	8.96	11.7	137	4.1	11.2	5.8
21190	AD-13	1.1 ††	113 †	2.05	32.3	6.74	3.35 ††	9.29	9.99	133	5.01	12.3	6.75
21193	GJ-11									128	3.83	11	6.32
21229	GI-23	5.12	135	2.62	33.1	7.23	4.82	8.86	12.3	134	4.21	11.1	6.25
21230	DE-23	4.6	123	2.2	30.5	6.6	4.37	7.97	10.3	125	3.9	10.8	5.43
21232	DE-23	4.84	123	3.08	31.5	7.04	4.36	8.24	11	129	4.31	11.2	5.97
21234	GH-09	8.09 ††	125	2.24	31.7					130	3.78	10.8	5.53
50004	DE-23	5.01	126	2.5	32.3	7.96	5.23	9.18	12.2	127	4.4	11.9	5.9
50005	GJ-23	5.72	113 †	3.18	30.3	6.55	4.65	8.4	11.3	118	4.85	10.9	7.31 ††
50008	GJ-23	5.69	131	3.1	32.7	6.62	4.6	8.41	11.1	128	5	11.3	6.19
50011	DE-23	5.22	125	2.39	34.3	7.01	4.77	8.65	11.6	130	4.35	11.9	6.25
50012	DN-23	4.81	133	3.12	32.1	7.77	4.62	9.86	11.2	138	4.23	11.3	5.87
50012	DN-24	4.53	116	3.09	31.3								
50014	DE-24	5.18	126	2.68	33.3	7.23	4.82	8.71	11.4	132	4.36	11.4	5.94
50017	DE-23	5.22	135	3.54	34.4	9.23 ††	6.76 ††	11.1 ††	15 ††	143	4.76	12.9	6.22
50018	DE-23	5.1	130	2.63	31.9	7.15	4.75	8.76	11.1	135	4.23	11.1	5.94
50020	GI-23	4.64	113 †	1.66	28.6	7.54	5.23	9.8	12.8	106 ††	4.18	11.9	5.59
50024	GJ-23	6.8 ††	134	2.4	33.5	7.68	4.81	9.6	11.8	141	3.76	11.3	5.59
50025	GJ-23	5.19	104 ††	3	28.1	7.34	4.82	9.41	11	107 ††	4.95	10	6.5
50027	DN-23	4.8	135	2.75	33.7	6.49	4.8	8.3	11	133	4.5	10.8	5.5
50029	AD-23	1.14 ††	130	2.98	36.5	6.13	2.63 ††	8.42	10.2	133	5.32 ††	11.7	6.11
52283	GJ-23	5.58	131	2.51	32.1	7.45	5.14	7.41	10.8	135	4.18	11.5	5.85
52384	DE-23	10.6 ††	135	7.8 ††	38.9 ††								
52387	DE-11	4.8	123	3	32.1	11.5 ††	6.86 ††	10.3	12.9	112 ††	2 ††	8.45 ††	2.82 ††
52491	GI-23	2.49 ††	135	9.61 ††	40.9 ††	7.51	4.95	8.5	11.5	131	2.3 ††	8.9 ††	3 ††
52494	GG-23	4.59	115	2.49	29.6	6.2	4.2	8	10.4	123	3.7	10.4	5.2
52495	GI-24	5.13	126	2.55	32.7	7.29	4.86	8.93	12	142	4.34	11.9	6.09
52508	AE-23	4.16	132	2.35	30.3	5.98	3.97 †	7.58	9.76	167 ††	10.8 ††	16.2 ††	7.85 ††

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Copper (mg/kg)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	**ASP 1902-2**	**ASP 1902-3**	**ASP 1902-4**	**ASP 1905-1**	**ASP 1905-2**	**ASP 1905-3**	**ASP 1905-4**	**ASP 1908-1**	**ASP 1908-2**	**ASP 1908-3**	**ASP 1908-4**
52565	DE-23	6.44	135	3.75 †	35	13.4 ††	10.5 ††	13.9 ††	16.9 ††	134	7.19 ††	14.6 ††	8.49 ††
52610	DE-24									140	4.1	11	5.75
52632	DE-11	49.8 ††	120	2.27	31	6.58	3.8 †	7.82	10.1	149	2.31 ††	12.5	4.63 ††
52636	DE-23	6.37	139	2.88	37	8.35	5.96 ††	10.2	14.1 ††	137	3.29 †	9.77	4.22 ††

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Iron (mg/kg)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
22	DE-23	33.6	198	243	219	96.9	77.1	82.3 ††	353	274	48.2	468	228
8888	DE-23	36.3	204	365	270	99.8	72.9	71.8	336	323 ††	49.3	460	228
10156	GI-23	58.7 ††	165 ††	175 †	164	78.2 ††	54.9 ††	58.7 ††	265 ††	217	41.6 †	350 †	172
10173	DN-24	34.3	212	2490 ††	221	96.5	65.2	71	336	293	46.8	427	217
11079	DE-23	45 ††	264 ††	552 ††	300 ††					255	47.2	413	207
20204	GJ-23	33.3	168 ††	268	40.3 ††	98.6	68.9	77.8	370	278	56.4 ††	426	221
21043	GJ-23	32.2	212	263	186	126 ††	76.5	89.5 ††	336	297	47.8	427	206
21088	DE-23	34.1	215	1480 ††	233	113 ††	75	75.8	345	249	44	396	194
21100	DE-24	43.2 ††	178 †	206	175	112 ††	69.4	76.6	298	240	56.4 ††	344 †	189
21178	DE-23	35	208	300	209	98	66.8	71	333	250	45	415	210
21190	AD-13	28.8 †	192	244	147	80.8 ††	55.3 ††	67.3	373	264	64.8 ††	557 ††	301 ††
21193	GJ-11									162 ††	44.5	321 ††	161 †
21229	GI-23	35	182	291	191	101	72.1	70.6	355	249	47.8	416	223
21230	DE-23	29.4	185	225	200	91	62.7	65.8	329	284	51.8	484 †	225
21232	DE-23	33.2	210	323	239	117 ††	74.4	73.9	387	289	46.9	447	223
21234	GH-09	34.7	205	273	254					252	47.7	427	193
50004	DE-23	34.6	207	262	242	93.5	69.2	72.1	341	262	44.6	454	208
50005	GJ-23	39.3 †	208	363	214	90	69	70.2	350	241	39.8 ††	336 ††	192
50008	GJ-23	34.5	199	258	224	95.8	64.9	69.3	327	235	45.1	407	198
50011	DE-23	41.7 †	208	249	206	103	73.8	75.2	356	242	47.8	416	212
50012	DN-23	33.4	211	376 †	202	94.7	64.2	68.2	325	252	45.1	402	198
50014	DE-23	30.9	189	263	175	98.2	67.4	71.3	340	226	45.3	386	200
50017	DE-23	33.4	215	306	229	104	71.8	73.3	402 ††	293	50.5	468	233
50018	DE-23	35.8	197	293	199	98.1	70.3	69.6	354	251	47.3	420	205
50020	GI-23	58.5 ††	154 ††	172 †	152	98.6	73.6	72.2	307	171 ††	46	410	173
50024	GJ-23	36.8	239 †	265	224	95.1	72.7	73.4	355	265	45.7	431	213
50025	GJ-23	32.7	215	363	228	92.6	67.7	76.5	322	264	50	426	223
50027	DN-23	33.1	219	316	239	101	69.4	74.3	379	256	46.4	413	208
50029	AD-23	47.4 ††	233	566 ††	326 ††	80.4 ††	74.7	73.4	365	290	68.9 ††	512 ††	262 ††
52283	GJ-23	41.6 †	169 ††	285	134	96.3	65	51.2 ††	268 ††	253	48.3	417	203
52384	DE-23	55.5 ††	216	298	199								
52387	DE-11	49.2 ††	274 ††	387 †	308 ††	358 ††	79.6	78.2	400 ††	269	45.6	440	206
52491	GI-23	33.8	159 ††	283	177	100	66.9	66.6	289 †	182 ††	44	299 ††	152 ††
52494	GG-23	30.1	159 ††	177	165	87.9 †	60.4	63.9	278 ††	208 †	45.3	332 ††	175
52495	GI-24	32.6	180	256	204	98.9	67.2	71.1	333	239	47.8	401	191
52508	AE-23	50.1 ††	197		144	87.8 †	55.4 ††	60.5 ††	248 ††				
52565	DE-23	37.1	201	352	231	95.1	72.1	69.2	346	267	35.2 ††	456	208

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Iron (mg/kg)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	**ASP 1902-2**	**ASP 1902-3**	**ASP 1902-4**	**ASP 1905-1**	**ASP 1905-2**	**ASP 1905-3**	**ASP 1905-4**	**ASP 1908-1**	**ASP 1908-2**	**ASP 1908-3**	**ASP 1908-4**
52610	DE-24									210	44	390	185
52632	DE-11	82 ††	217	263	217	106 †	57.4 †	68.8	310	268	21.5 ††	440	213
52636	DE-23	39 †	217	303	279	96.3	70.5	74	356	289	50.3	397	190
52639	DE-38									339 ††	51.3	458	214

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Lead (µg/kg)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	**ASP 1902-2**	**ASP 1902-3**	**ASP 1902-4**	**ASP 1905-1**	**ASP 1905-2**	**ASP 1905-3**	**ASP 1905-4**	**ASP 1908-1**	**ASP 1908-2**	**ASP 1908-3**	**ASP 1908-4**
10156	GI-23	130 ††	336 ††	247 ††	246 ††					78.5 ††	39 ††	372	158
10173	DN-24	1.66	112	181	121	241	30.9	82.5	135	58.2	4.1	424	146
20204	GJ-23	90.3 ††	247 ††	364 ††	382 ††	250	882 ††	399 ††	362 ††	118 ††	211 ††	218 ††	109 ††
21088	DE-23					526 ††	258 ††	277 ††	256 ††	306 ††	187 ††	547 ††	404 ††
21088	DE-23	53.8 ††	240 ††	363 ††	309 ††								
21100	DE-24	2.68	103	149	122	277	24.8 ††	97	146	52.9	0.1	387	149
21178	DE-24	16	113	167	141	230	37	83	135	63	19 ††	360	140
21229	GI-24	11.7	113	165	140	292	33.9	77	143	69.8	11.3	397	173
21230	DE-24	3.93	114	168	187	540 ††	70.7 ††	183 ††	278 ††	64.5	6.2	456 ††	171
50004	DE-24	3.65	114	160	160	287	47.3 ††	88.5	147	54.5	7.65	426	156
50005	GJ-23	105 ††	106	264 ††	152	277	55.8 ††	102	169	64.3	13.7	423	185
50011	DE-24	10.7	109	154	121	249	36.1	87.2	140	60.7	11	408	150
50012	DN-24	1	91 ††	129 ††	107	276	35	152 ††	165	59	3	371	140
50014	DE-24	2.5	110	167	183	287	39.8	115	153	56.7	1	403	147
50018	DE-24	10.2	118	165	174	274	37.1	101	162	62.4	9.86	402	171
50020	GI-23									228 ††		306 ††	146
50024	GJ-24	5.3	142 ††	159	126	253	33	84	142	42.6 ††	2	389	171
52495	GI-24	10.6	96.7 ††	157	139	291	35	90	159	55.4	2.38	387	160
52565	DE-23									2640 ††	2550 ††	3080 ††	2410 ††
52610	DE-24									52		380	135

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Magnesium (%w/w)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
22	DE-23	0.116	0.274	0.304	0.299	0.387	0.242	0.56	0.241	1.29	0.141	0.316	0.206
8888	DE-23	0.122	0.283	0.316	0.305	0.384	0.237	0.521	0.238	1.22	0.138	0.297	0.198
10156	GI-23	0.114	0.257	0.26 ††	0.266 †	0.346	0.21	0.478	0.223	1.15	0.13	0.278	0.183
10173	DN-24	0.119	0.279	0.327	0.298	0.357	0.218	0.481	0.215	1.38	0.142	0.306	0.199
10181	GF-23	0.119	0.291	0.332	0.302	0.411	0.243	0.535	0.24	1.29	0.138	0.306	0.192
11079	DE-23	0.129	0.296	0.337	0.332 ††					1.08	0.137	0.291	0.192
20204	GJ-23	0.134 ††	0.287	0.311	0.298	0.376	0.24	0.5	0.261 ††	0.963 †	0.147	0.283	0.198
21043	GJ-23	0.115	0.258	0.291	0.278	0.363	0.22	0.485	0.225	1.25	0.127	0.262	0.182
21088	DE-23	0.109	0.271	0.289	0.296	0.366	0.226	0.488	0.227	1.19	0.12	0.269	0.173
21100	DE-24	0.143 ††	0.308	0.333	0.346 ††	0.411	0.247	0.563	0.253	1.36	0.164 ††	0.314	0.208
21178	DE-23	0.11	0.27	0.29	0.29	0.361	0.212	0.479	0.226	1.19	0.13	0.29	0.19
21190	AD-13	0.127	0.31 †	0.335	0.314	0.405	0.235	0.568	0.267 ††	1.33	0.157 ††	0.333 †	0.222 ††
21193	GJ-11									1.38	0.12	0.28	0.16 ††
21229	GI-23	0.122	0.288	0.308	0.299	0.385	0.236	0.535	0.249	1.23	0.131	0.293	0.199
21230	DE-23	0.101	0.226 ††	0.246 ††	0.227 ††	0.297 ††	0.174 ††	0.37 ††	0.18 ††	1.15	0.126	0.283	0.181
21232	DE-23	0.11	0.26	0.28	0.28	0.41	0.23	0.53	0.24	1.14	12 ††	0.29	0.19
21234	GH-09	0.1	0.25	0.273	0.25 ††					0.1 ††	0.113	0.261	0.161 ††
50004	DE-23	0.116	0.279	0.294	0.297	0.363	0.221	0.495	0.229	1.18	0.126	0.31	0.189
50005	GJ-23	0.129	0.295	0.325	0.304	4.25 ††	0.226	0.557	0.256 †	1.32	0.108 ††	0.376 ††	0.269 ††
50008	GJ-23	0.115	0.271	0.306	0.295	0.376	0.228	0.489	0.227	1.27	0.145	0.291	0.189
50011	DE-23	0.12	0.277	0.308	0.291	0.38	0.23	0.523	0.24	1.19	0.132	0.287	0.193
50012	DN-23	0.101	0.273	0.289	0.272 †	94.7 ††	0.228	0.506	0.231	1.14	0.126	0.296	0.186
50014	DE-23	0.11	0.267	0.302	0.286	0.389	0.241	0.523	0.24	1.19	0.13	0.296	0.185
50017	DE-23	0.113	0.274	0.314	0.293	0.364	0.225	0.507	0.234	1.27	0.137	0.305	0.199
50018	DE-23	0.118	0.266	0.31	0.292	0.373	0.23	0.514	0.231	1.23	0.13	0.294	0.19
50020	GI-23	0.1	0.3	0.2 ††	0.3	0.435 ††	0.265 ††	0.615 ††	0.285 ††	1.06	0.13	0.27	0.18
50024	GJ-23	0.122	0.281	0.3	0.301	0.374	0.232	0.51	0.239	1.13	0.138	0.301	0.197
50025	GJ-23	0.116	0.264	0.296	0.3	0.361	0.228	0.534	0.239	1.16	0.136	0.289	0.195
50027	DN-23	0.119	0.305	0.319	0.308	0.385	0.227	0.524	0.233	1.2	0.13	0.277	0.193
50029	AD-23	0.122	0.278	0.319	0.32 †	0.352	0.21	0.492	0.229	1.2	0.14	0.301	0.198
52283	GJ-23	0.128	0.283	0.31	0.295	0.368	0.231	0.484	0.245	1.2	0.134	0.296	0.195
52384	DE-23	0.08 ††	0.25	0.29	0.28								
52387	DE-11	0.107	0.258	0.299	0.264 †	0.258 ††	0.174 ††	0.381 ††	0.171 ††	1.11	0.129	0.23 ††	0.175
52491	GI-23	0.114	0.279	0.302	0.293	0.371	0.226	0.504	0.237	1.12	0.125	0.279	0.181
52494	GG-23	0.109	0.263	0.284	0.279	0.348	0.212	0.481	0.216	1.16	0.126	0.281	0.181
52495	GI-24	0.117	0.275	0.304	0.293	0.377	0.229	0.534	0.242	1.34	0.138	0.317	0.196
52508	AE-23	0.11	0.27	0.3	0.29	0.33	0.19 ††	0.47	0.21 †	1.1	0.11	0.32	0.22 ††

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Magnesium (%w/w)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	**ASP 1902-2**	**ASP 1902-3**	**ASP 1902-4**	**ASP 1905-1**	**ASP 1905-2**	**ASP 1905-3**	**ASP 1905-4**	**ASP 1908-1**	**ASP 1908-2**	**ASP 1908-3**	**ASP 1908-4**
52565	DE-23	0.11	0.249	0.275	0.269 †	0.33	0.207	0.441	0.204 ††	1.05	0.115	0.271	0.169 ††
52610	GG-23									1.1	0.12	0.28	0.175
52632	DE-11	0.07 ††	0.24	0.25 ††	0.25 ††	0.368	0.22	0.505	0.225	1.33	0.14	0.31	0.2
52636	DE-23	0.114	0.262	0.292	0.283	0.35	0.216	0.474	0.222	1.11	0.134	0.268	0.174
52639	DE-38									1.25	0.141	0.325	0.198

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Manganese (mg/kg)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
22	DE-23	43.5	28.3	43.1 †	54.5	46.1	57.3	14.4	39.5	146	22.1	46.7	317
8888	DE-23	45.5	29.8	47.7	58.4	45.4	58.1	13.6	39.7	149	22.1	45.8	319
10156	GI-23	40.5 †	29.1	29.5 ††	29.7 ††	40.4	48.4 ††	11.9	33.6 ††	136	19.4	41.4	276
10173	DN-24	45.6	28.9	59.4 ††	56.4	43.5	52.3 †	13.1	36	156	20.9	43.9	298
11079	DE-23	52.9 ††	36.7 ††	60.5 ††	70.1 ††					155	22.5	45.6	310
20204	GJ-23	44.9	15.2 ††	31.6 ††	46.2 ††	44.4	44.7 ††	24.1 ††	34.1 †	81.6 ††	17.8 ††	28 ††	269
21043	GJ-23	27.5 ††	19.4 ††	32.5 ††	44.5 ††	39.6 †	49.3 ††	14.9	35.2	167 ††	20.5	42.6	260 ††
21088	DE-23	43.5	28.9	54.4 ††	59	43.9	54.5	12.5	36.3	144	18.8	41	254 ††
21100	DE-24	50.1 ††	29.6	46.1	60.3	48.3	57.6	14.4	39.1	156	25 ††	45.9	316
21178	DE-23	46	30	51	60	44.4	54.4	13.5	38.8	140	20	43	290
21190	AD-13	30.9 ††	27.4	48	36.9 ††	34.5 ††	45.2 ††	10.5 ††	33.9 †	152	23.3	49.4	342 ††
21193	GJ-11									122	23.9 ††	47.2	262 ††
21229	GI-23	45.5	27.7	48	55.1	44.8	57.4	13.4	41.2	139	21	43.8	321 †
21230	DE-23	46	27.8	48.5	55.3	42.6	54.4	12.2	37.1	132	21.1	42.8	291
21232	DE-23	42.9	28.1	47.3	55.8	47.7	57	13.7	40.1	142	21	44.3	293
21234	GH-09	43.4	32 ††	55 ††	53.7					155	20.5	47.7	295
50004	DE-23	44.3	29.4	46.3	58.4	41.5	54.8	12.9	38.6	145	20.4	46.6	294
50005	GJ-23	46.4	28.3	44.6	53.2	43.9	58.3	12.7	40.4	129	20	40.3	282
50008	GJ-23	44.1	27.5	46	53.6	42.7	54.4	12.6	36.8	137	20.2	41.3	294
50011	DE-23	46.7	28.7	50.5	56.2	45.1	57.4	13.6	39.5	134	20.9	43	291
50012	DN-23	42.8	30.4	46.6	55.8	45.2	58.1	14	40.6	153	22.2	47.4	301
50014	DE-23	42.2	27.2	47.5	54.7	46.2	57.3	13.6	39.2	142	21.3	44.4	298
50017	DE-23	45.1	29.5	52 †	57.7	48.1	63.2 †	14.8	43.8 ††	147	22.7	46.8	311
50018	DE-23	44.7	27.2	48.3	55	44	57.5	13.2	38.6	139	20.8	44.1	295
50020	GI-23	43.2	24.7 †	33.3 ††	50.1	46.4	60.3	13.8	38.2	40 ††	18.4	40.5	266 †
50024	GJ-23	45.6	30.8	45.3	58	46.8	59.2	14.2	41.3	140	21	42.9	289
50025	GJ-13	44.2	27.5	45.2	54.6	45.4	59.2	14.6	40.5	133	21	42	285
50027	DN-23	43.7	30.2	48.6	57.1	46	56.4	13.6	40.3	140	20.5	42.6	285
50029	AD-23	48.8 ††	26.1	49.1	60.1	38.9 ††	50 †	12.8	40.3	138	21.7	44.2	316
52283	GJ-23	46.6	29.2	47.5	56.3	44	57.2	10.2 ††	39	140	21.3	43.4	300
52384	DE-23	37.9 ††	19.2 ††	36 ††	49.2								
52387	DE-11	41.3	25.2 †	42.2 †	52.8	40.2	51.9 †	10.8 ††	37.6	149	22.2	47.6	295
52491	GI-23	44.4	28.4	46.7	55.6	46	58.2	14.9	39.7	129	19	40	272
52494	GG-23	40.1 †	26.2	43.2 †	50.7	40	51.1 †	12.3	34.6	132	19.4	39.9	266 †
52495	GI-24	44.1	28.2	48.3	55.6	44.8	57.4	13.8	38.3	145	20.8	46.4	296
52508	AE-23	44.4	29	46.4	57.6	38.4 ††	47.8 ††	12	34.5	138	20.2	38.5	440 ††
52565	DE-23	43.9	27.5	46.8	53.2	44.9	57.2	14.2	39.3	140	19.6	42.6	283

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Manganese (mg/kg)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	**ASP 1902-2**	**ASP 1902-3**	**ASP 1902-4**	**ASP 1905-1**	**ASP 1905-2**	**ASP 1905-3**	**ASP 1905-4**	**ASP 1908-1**	**ASP 1908-2**	**ASP 1908-3**	**ASP 1908-4**
52610	DE-24									150	20	45.5	285
52632	DE-11	39.1 ††	23.2 ††	40 ††	51.2	43	51.6 †	10.2 ††	33.4 ††	142	18.4	42.2	288
52636	DE-23	45.4	28.5	48.3	58.8	43.8	56.4	13.1	38.6	126	19.7	37.1	252 ††
52639	DE-38									133	19.8	43.6	292

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Molybdenum (µg/kg)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
22	DE-24	237	179	48.4	285	178	294	230	1320	6180	887	310	1030
8888	DE-24	250	190	80	280	168	289	214	1230	5370 ††	840	304	987
10156	Not Specified	238	288 ††	210 ††	249 ††								
10173	DN-24	273	217 ††	91.3	311 ††	183	305	226	1330	7200 ††	956	340 ††	1090
11079	DE-23	303 ††	146 ††		402 ††					5580	880	460 ††	1070
20204	GJ-23	270	204	46.5	341 ††	253 ††	232 ††	245	949 ††	7780 ††	1430 ††	469 ††	1270 ††
21088	DE-23	273	185	54.2	276	216 ††	307	212	1310	5470	856	297	1010
21100	DE-24	258	217 ††	57.4	342 ††	196	342 ††	267 ††	1430	7330 ††	1050 ††	280 ††	1070
21178	DE-24	262	239 ††	86	309	192	296	240	1280	5500	840	280 ††	960 ††
21229	GI-24	257	189	64.3	291	213 ††	323	230	1450	6010	855	319	1060
21230	DE-24	250	180	42.4	285	179	313	225	1430	5980	927	319	1040
50004	DE-24	244	208	63.3	296	180	259 ††	182 ††	1070 ††	6140	901	303	990
50005	GJ-23	294 ††	222 ††	83.8	304	231 ††	374 ††	238	1600 ††	7010 ††	1020 ††	179 ††	1160 ††
50011	DE-24	248	191	64.7	285	187	301	231	1350	5990	861	301	1000
50012	DN-24	220 ††	166	48	258 ††	174	293	207	1300	5970	845	289	1020
50014	DE-24	267	177	47.5	293	183	310	220	1360	5770	917	310	1040
50018	DE-24	264	176	66.5	289	198	306	228	1290	5990	890	313	1060
50020	GI-23	1120 ††				188	145 ††	267 ††	1170	5020 ††	911	335	1000
50024	GJ-24	257	181	49.3	286	182	328	236	1420	6340	911	308	1020
50027	DN-23	274	84 ††	10 ††	364 ††	222 ††	311	129 ††	1290	5650	854	261 ††	989
50029	AD-23	233	145 ††	130 ††	321 ††	240 ††	437 ††	242	1260	6070	1050 ††	495 ††	1230 ††
52491	GI-23					118 ††	79.9 ††	61.4 ††	197 ††				
52495	GI-24	246	167	56.4	269	182	304	219	1350	6070	890	309	1050
52565	DE-23	555 ††	54.6 ††	58	64.5 ††	96 ††	173 ††	114 ††	784 ††	7470 ††	1480 ††	1820 ††	1970 ††
52610	DE-24									10500 ††	1000	530 ††	1100
52636	DE-23	555 ††	54.6 ††	58	64.5 ††	93.8 ††	175 ††	103 ††	809 ††				

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Nitrogen (%w/w)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
22	CA-37	2.06	2.33	0.963	3.46	2.76	1.65	2.09	1.61	3.85	3.88	2.94	2.09 †
8888	CA-37	2.13	2.29	1.06	3.48	2.8	1.67	2.15	1.69	3.65	3.66	2.72	1.91 †
10156	CA-37	2.11	0.257 ††	0.956	3.48	42.9 ††	43.3 ††	44.4 ††	43.8 ††	3.79	3.83	2.83	2.02
10173	CA-37	2.15	2.33	1.09	3.44	2.77	1.71	2.16	1.69	3.8	3.85	2.85	2.04
10181	CA-37	2.22 †	2.41	1.06	3.59	2.78	1.66	2.14	1.67	3.82	3.83	2.86	2.05
10181	GF-31	2.1	2.19 †	0.966	3.42	2.66	1.55	1.96 ††	1.52	3.64	3.79	2.82	1.93
20204	CA-37	2.12	2.37	0.985	3.53	2.73	1.58	2.12	1.64	3.74	3.71	2.75	2.04
21043	CA-37	2.09	2.33	0.913	3.51	2.7	1.57	2.32 ††	1.6	3.84	3.88	2.83	2.05
21088	CA-37	2.06	2.31	0.947	3.44	2.75	1.6	2.12	1.62	3.57	3.49	2.58 ††	1.86 †
21100	CA-37	2.19	2.45	1.07	3.62	2.8	1.81 ††	2.19	1.69	3.75	3.75	2.84	2.01
21190	GE-38	2.1	2.19 †	1.12	3.13 ††	2.62	1.54	1.96 ††	1.53	3.82	3.75	3.01 ††	2.13 †
21229	GE-31	2.06	2.25	0.95	3.35	2.63	1.56	2.09	1.61	3.63	3.67	2.74	2
21229	CA-37	2.08	2.34	1.02	3.43	2.8	1.61	2.13	1.63	3.7	3.56	2.8	2.02
21230	CA-37	2.09	2.31	0.992	3.47	2.63	1.51	1.98	1.49	3.68	3.7	2.75	1.93
21232	CA-37	2.14	2.21 †	1.02	3.64	2.54 ††	1.5	2.14	1.57	3.8	3.49	2.8	2.01
21232	ZZ-38									3.96 †	3.32 ††	2.47 ††	1.99
21234	GE-32	1.87 ††	2.07 ††	0.863	3.14 ††					3.32 ††	3.41 ††	2.56 ††	1.64 ††
50004	CA-37	2.16	2.41	1.1	3.56	2.68	1.55	2.05	1.65	3.8	3.83	2.82	1.97
50005	CA-37	2.11	2.37	0.936	3.54	2.7	1.55	2.08	1.6	3.74	3.71	2.74	1.99
50008	CA-27	2.11	2.34	1.02	3.52	2.76	1.68	2.12	1.63	3.82	3.82	2.85	1.99
50011	CA-37	2.08	2.35	1.03	3.49	2.71	1.64	2.09	1.63	3.69	3.67	2.76	1.99
50012	CA-37	2.05	2.28	0.942	3.41	2.74	1.6	2.1	1.61	3.7	3.68	2.8	1.98
50014	CA-37	2.11	2.34	0.972	3.51	2.75	1.68	2.02	1.53	3.78	3.79	2.83	1.98
50017	CA-37	2.13	2.41	1	3.55	2.73	1.62	2.14	1.63	3.81	3.79	2.82	1.98
50018	CA-37	2.1	2.35	0.994	3.51	2.71	1.63	2.12	1.64	3.77	3.74	2.82	2.01
50020	CA-37	1.95 ††	2.1 ††	1.1	3.3	2.58	1.59	1.92 ††	1.54	3.58	3.61	2.69	1.92
50024	CA-37	2.18	2.39	0.971	3.59	2.81	1.67	2.22	1.75	3.83	3.73	2.86	2.02
50027	CA-37	2.13	2.38	1.29 ††	3.36	2.7	1.63	2.06	1.6	3.69	3.7	2.75	2.08 †
50029	CA-37	2.02	2.26	1.02	3.44	2.45 ††	1.64	2.06	1.61	3.8	3.77	2.87	2.05
50032	CA-37	2.16	2.37	1.14	3.5	2.59	1.59	2.02	1.57				
52283	CA-37	2.1	2.31	0.75 ††	3.61	2.71	1.63	2.14	1.69	3.74	3.69	2.8	1.98
52384	CA-37	2.01 †	2.26	0.94	3.32								
52387	CA-37	2.13	2.36	1.31 ††	3.3	2.76	1.79 †	2.09	1.81 †	3.28 ††	3.7	2.81	2.09 †
52491	CA-37	2.17	2.36	0.999	3.46	2.66	1.53	2.05	1.57	3.65	3.63	2.71	1.94
52494	CA-37	2.03	2.23	0.85	3.04 ††	2.64	1.52	2.05	1.45 †	3.65	3.63	2.73	1.94
52495	CA-37	2.12	2.4	1.08	3.54	2.69	1.63	2.13	1.69	3.73	3.71	2.85	2.02
52508	GE-38	2.21 †	2.44	1	3.65	2.45 ††	1.44 ††	1.92 ††	1.45 †	3.38 ††	3.51	2.45 ††	1.8 ††

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Nitrogen (%w/w)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	**ASP 1902-2**	**ASP 1902-3**	**ASP 1902-4**	**ASP 1905-1**	**ASP 1905-2**	**ASP 1905-3**	**ASP 1905-4**	**ASP 1908-1**	**ASP 1908-2**	**ASP 1908-3**	**ASP 1908-4**
52565	CA-37	2.01 †	2.34	0.903	3.41	2.8	1.78 †	2.2	1.75	3.84	3.72	2.71	1.97
52632	CA-37	2.04	2.28	0.87	3.4	2.66	1.68	2.1	1.65	3.6	3.56	2.73	1.96
52636	CA-37	2.09	2.32	0.987	3.47	2.7	1.56	2.31 ††	1.69	3.36 ††	3.35 ††	2.68	2.1 †
52639	CA-37									3.57	3.54	2.72	1.94

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Nitrate Nitrogen (mg/kg)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
22	BA-31	0.001	0.001	0.001	0.001	23.7	0.545	75.6	58.5	3430	2.13	5.2	1.48
10173	BB-31	47 ††	10	7	9					3570	0.99	10	4
20204	BB-30	3	1.5	5	6	20	21 ††	30 ††	25	3450	70 ††	20 ††	7
21088	BB-31	2.06	2.31	0.947	3.44	21	5	56.2	43	3140	6	10	6
21100	BB-31	1.8	21.2	10.8	22.4 ††	15.7	9.56	53.1	37.8	2510 ††	2.63	11.4	6.37
21178	BB-31					26	2.6	62	49	3450	0.5	7	0.5
21229	BB-31	6.68	13.5	11.9	6.7	18.2	4	70.2	58.4	3230	2.09	7.7	1.6
21232	BB-31	7.85	17.6	11.4	9.03	26.2	7.63	70.8	52	3400	2.05	10.8	8.48 †
50005	BA-30	0.369	6.58	1.94	0.523	33.8	6.35	95.9	74	3140	0.949	5.44	1.95
50011	BB-31	5.79	14.6	13.2	3.22	19.8	5.87	60.9	48.2	3170	4.67	11.7	3.77
50012	BB-31	5.01	10	5.24	4.24	14.5	4.08	51	38.5	3390	3.68	9.27	2.92
50017	BB-31	9.3	10.8	10	8.5	17				3290	5.9	11.5	3.95
50020	BA-31									3290			
50025	BB-31	46.7 ††	33.9 ††	40 ††	41.7 ††	62.5 ††	60 ††	82.5	82.5	3500	16 ††	41 ††	25 ††
50027	BB-31	7	10	3	3	23	7	74	56	3390	4	6	3
50029	BB-31	4.25	11.1	7.39	7.43	16.4	1.66	59.4	43.9	3520	5.24	19.7 ††	20.4 ††
50032	BB-31	104 ††	59.5 ††	30.7 ††	74.5 ††								
52494	BA-31	6.37	12	4.12	4.83	11.8	5.24	65.2	47.9	3180	9.28 †	5.1	1.4
52565	BA-31					60.9 ††	29.4 ††	87.5	70.6	3330	1.95	8.66	2.59
52632	BB-31	63.5 ††	93.3 ††	58.7 ††	68.9 ††					3720	78.7 ††	74.7 ††	33.9 ††

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Phosphorus (%w/w)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
22	DE-23	0.385	0.156	0.052	0.56	0.179	0.198	0.328	0.401	0.312	0.351 †	0.137	0.141
8888	DE-23	0.402	0.167	0.06	0.574	0.182	0.197	0.314	0.392	0.321	0.356 †	0.135	0.143
10156	GI-23	0.286 ††	0.128 ††	0.139 ††	0.134 ††	0.187	0.185	0.317	0.395	0.315	0.328	0.13	0.135
10173	DN-24	0.391	0.175	0.065	0.575	0.192	0.197	0.322	0.383	0.378 ††	0.372 ††	0.147 †	0.148 †
10181	GF-31	0.414	0.166	0.062	0.568	0.179	0.192	0.305	0.395	0.322	0.349 †	0.134	0.134
11079	DE-23	0.45 ††	0.177	0.07 ††	0.64 ††					0.289	0.334	0.124	0.133
20204	GJ-23	0.409	0.173	0.059	0.543	0.17	0.175	0.295	0.38	0.302	0.329	0.129	0.132
21043	GJ-23	0.367	0.143	0.052	0.514	0.177	0.188	0.299	0.383	0.336 †	0.317	0.118	0.127
21088	DE-23	0.339 †	0.153	0.057	0.575	0.168	0.176	0.264 ††	0.339 ††	0.275 †	0.29 ††	0.114	0.117 †
21100	DE-24	0.382	0.156	0.051	0.538	0.178	0.183	0.308	0.369	0.358 ††	0.398 ††	0.14	0.142
21178	DE-23	0.39	0.17	0.06	0.56	0.174	0.173	0.292	0.365	0.3	0.31 †	0.13	0.14
21190	GE-30	0.393	0.153	0.05	0.56	0.163	0.164 ††	0.291	0.388	0.314	0.333	0.125	0.127
21229	GI-23	0.388	0.168	0.060	0.554	0.18	0.195	0.324	0.42 †	0.309	0.332	0.131	0.139
21230	DE-23	0.355	0.144	0.053	0.501	0.136 ††	0.146 ††	0.234 ††	0.304 ††	0.289	0.317	0.121	0.125
21232	DE-23	0.37	0.15	0.06	0.54	0.19	0.19	0.31	0.41	0.3	0.33	0.13	0.13
21234	GE-30	0.749 ††	0.325 ††	0.152 ††	1.19 ††					0.213 ††	0.221 ††	0.104 ††	0.112 ††
50004	DE-23	0.363	0.161	0.056	0.554	0.172	0.184	0.31	0.387	0.318	0.335	0.139	0.136
50005	GJ-23	0.421	0.181	0.058	0.621 ††	0.186	0.199	0.316	0.398	0.328	0.34	0.113 †	0.123
50008	GJ-23	0.393	0.162	0.061	0.543	0.175	0.19	0.299	0.374	0.313	0.332	0.133	0.137
50011	DE-23	0.395	0.159	0.059	0.546	0.173	0.186	0.299	0.382	0.296	0.326	0.126	0.135
50012	DN-23	0.383	0.165	0.054	0.541	0.172	0.19	0.294	0.38	0.317	0.331	0.124	0.132
50014	DE-23	0.384	0.157	0.061	0.55	0.183	0.199	0.309	0.394	0.322	0.344	0.137	0.14
50017	DE-23	0.36	0.15	0.057	0.531	0.168	0.18	0.293	0.367	0.313	0.331	0.13	0.133
50018	DE-23	0.387	0.158	0.061	0.551	0.176	0.19	0.308	0.394	0.305	0.332	0.129	0.133
50020	GI-23	0.35	0.1 ††		0.5	0.18	0.195	0.315	0.385	0.375 ††	0.375 ††	0.135	0.135
50024	GJ-23	0.377	0.172	0.055	0.545	0.183	0.195	0.319	0.4	0.305	0.309 †	0.126	0.129
50025	GJ-23	0.358	0.153	0.050	0.526	0.232 ††	0.247 ††	0.42 ††	0.504 ††	0.354 ††	0.361 †	0.148 †	0.16 ††
50027	DN-23	0.372	0.158	0.060	0.548	0.18	0.187	0.319	0.386	0.308	0.329	0.125	0.128
50029	AD-23	0.451 ††	0.161	0.061	0.546	0.162	0.177	0.292	0.387	0.305	0.329	0.132	0.134
52283	GJ-23	0.384	0.168	0.054	0.583	0.18	0.188	0.319	0.473 ††	0.299	0.331	0.133	0.135
52384	DE-23	0.37	0.14	0.05	0.53								
52387	DE-30	0.309 ††	0.169	0.057	0.434 ††	0.128 ††	0.17	0.252 ††	0.293 ††	0.304	0.333	0.136	0.142
52491	GI-23	0.383	0.162	0.056	0.561	0.175	0.184	0.299	0.376	0.285	0.317	0.2 ††	0.126
52494	GG-23	0.363	0.156	0.056	0.533	0.171	0.181	0.302	0.374	0.312	0.326	0.13	0.131
52495	GI-24	0.374	0.159	0.060	0.532	0.182	0.188	0.319	0.398	0.331	0.338	0.139	0.137
52508	AE-30	0.37	0.15	0.05	0.52	0.16	0.17	0.28	0.33 ††	0.28	0.29 ††	0.12	0.13
52565	DE-23	0.455 ††	0.192 ††	0.072 ††	0.625 ††	0.169	0.192	0.289	0.359	0.297	0.307 †	0.122	0.121

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Phosphorus (%w/w)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
52610	GG-23									0.28	0.31 †	0.12	0.13
52632	DE-30	0.87 ††	0.52 ††	0.16 ††	2.18 ††	0.152 ††	0.155 ††	0.263 ††	0.34 ††	0.3	0.34	0.14	0.15 †
52636	DE-23	0.446 ††	0.196 ††	0.072 ††	0.655 ††	0.188	0.201	0.329	0.443 ††	0.311	0.355 †	0.125	0.124
52639	DE-38									0.399 ††	0.406 ††	0.204 ††	0.204 ††

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Potassium (%w/w)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
22	DE-23	0.374	1.79	0.524	2.02	1.61	1.64	1.8	1.96	5.14	0.985	0.425	0.667
8888	DE-23	0.384	1.78	0.54	2.03	1.54	1.59	1.66	1.87	5.06	1.01	0.428	0.654
10156	GI-23	0.349	1.58	1.63 ††	1.65 ††	1.45	1.45	1.53	1.77	4.8	0.931	0.398	0.624
10173	DN-24	0.378	1.72	0.545	2	1.57	1.55	1.61	1.85	5.4	0.993	0.418	0.647
10181	GF-23	0.405	1.82	0.587	2.11 †	1.74 †	1.79 ††	1.81	2.08	5.27	1.01	0.434	0.659
11079	DE-23	0.284 ††	1.44 ††	0.35 ††	1.97					4.39	0.913	0.356	0.577
20204	GJ-23	0.369	2.03 ††	0.541	2.25 ††	1.47	1.47	2.01 ††	1.75	4.65	0.84	0.463	0.567
21043	GJ-23	0.319	1.42 ††	0.495	1.84	1.43	1.48	1.54	1.77	5	0.89	0.367	0.6
21088	DE-23	0.377	1.77	0.528	2.02	1.4	1.42	1.53	1.75	4.66	0.816	0.378	0.567
21100	DE-24	0.438 ††	1.9	0.561	2.3 ††	1.72 †	1.75	1.85	2.04	5.67 ††	1.21 ††	0.432	0.724 †
21178	DE-23	0.38	1.76	0.51	2.04	0.174 ††	0.147 ††	0.158 ††	0.188 ††	4.87	0.92	0.39	0.62
21190	GE-09	0.358	2 ††	0.58	2.2 ††	1.96 ††	1.78 ††	1.79	2.24 ††				
21193	GJ-11									4.94	0.92	0.37	0.59
21229	GI-23	0.372	1.73	0.528	1.94	1.57	1.6	1.65	1.96	4.97	0.94	0.41	0.649
21230	DE-23	0.347	1.68	0.49	1.87	1.27	0.13 ††	1.34	1.55 †	4.48	0.904	0.4	0.61
21232	DE-23	0.35	1.66	0.58	1.99	1.42	1.56	1.49	1.83	4.47	0.88	0.53 ††	0.65
21234	GH-20	0.454 ††	1.77	0.612 †	1.94					4.27	0.991	0.524 ††	0.732 ††
50004	DE-23	0.347	1.64	0.49	1.9	1.38	1.5	1.61	1.81	5.33	1.02	0.445	0.675
50005	GJ-23	0.457 ††	1.66	0.618 ††	1.79	1.41	1.42	1.5	1.79	4.49	1.01	0.565 ††	0.736 ††
50008	GJ-23	0.381	1.75	0.53	1.94	1.47	1.57	1.63	1.83	5.04	0.971	0.4	0.616
50011	DE-23	0.39	1.72	0.535	1.94	1.54	1.58	1.66	1.94	4.79	0.947	0.388	0.638
50012	DN-23	0.335	1.59	0.493	1.74 †	1.56	1.46	1.65	1.84	4.94	0.846	0.414	0.616
50014	DE-23	0.378	1.8	0.563	2.01	1.59	1.65	1.69	1.93	5.1	0.982	0.417	0.617
50017	DE-23	0.332	1.59	0.51	1.73 †	1.39	1.44	1.51	1.68	4.4	0.79	0.374	0.529
50018	DE-23	0.372	1.82	0.529	1.87	1.54	1.59	1.74	1.78	4.91	0.931	0.416	0.63
50020	GI-23	0.35	1.55	0.4 ††	1.7 ††	1.4	1.36	1.56	1.76	6.07 ††	0.81	0.355	0.535
50024	GJ-23	0.364	1.79	0.527	1.93	1.61	1.63	1.75	1.95	5.08	0.919	0.421	0.629
50025	GJ-23		1.78	0.55	1.93	1.62	1.7	1.73	2.03	4.72	0.995	0.431	0.648
50027	DN-23	0.375	1.84	0.528	1.9	1.51	1.57	1.66	1.83	4.93	0.928	0.374	0.62
50029	AD-23	0.341	1.79	0.534	1.95	1.37	1.41	1.52	1.72	4.81	0.808	0.452	0.565
52283	GJ-23	0.383	1.81	0.531	1.96	1.25	1.59	1.59	1.96	4.95	0.942	0.409	0.624
52384	DE-23	0.36	1.64	0.5	1.89								
52387	DE-09	0.359	1.79	0.555	2	0.874 ††	1.4	1.46	1.6	4.92	0.936	0.382	0.603
52491	GI-23	0.346	1.68	0.499	1.89	1.49	1.52	1.6	1.88	4.71	0.887	0.368	0.586
52494	GG-23	0.354	1.69	0.502	1.91	1.45	1.48	1.59	1.78	4.82	0.927	0.387	0.609
52495	GI-24	0.384	1.7	0.53	1.96	1.56	1.59	1.71	1.97	5.14	0.987	0.424	0.654
52508	AE-23	0.32	1.5 ††	0.46	1.76 †	1.25	1.31	1.39	1.68	4.34	0.83	0.31 ††	0.85 ††

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Potassium (%w/w)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	**ASP 1902-2**	**ASP 1902-3**	**ASP 1902-4**	**ASP 1905-1**	**ASP 1905-2**	**ASP 1905-3**	**ASP 1905-4**	**ASP 1908-1**	**ASP 1908-2**	**ASP 1908-3**	**ASP 1908-4**
52565	DE-23	0.354	1.51 †	0.462	1.75 †	1.46	1.48	1.51	1.72	4.83	0.851	0.491 †	0.577
52610	GG-23									4.3	0.83	0.37	0.52
52632	DE-11	0.37	1.74	0.52	1.93	1.49	1.49	1.58	1.84	4.22	0.84	0.4	0.56
52636	DE-23	0.428 ††	2.07 ††	0.587	2.35 ††	1.42	1.5	1.55	1.75	4.37	1.01	0.243 ††	0.265 ††
52639	DE-38									4.34	0.964	0.437	0.679

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Selenium (µg/kg)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
22	DE-24	49.4	75.3	23.6	118	466	40.7	85.4	77.2	669	270	36.5	7.23
8888	DE-24	60	70	40	120	552	50.1	104	72.1	635	330	70.9 ††	
10156	GI-23	336 ††	698 ††	758 ††	828 ††								
10173	DN-24	50.7	90.7	30.7	112	478	35.8	114	73.1	746 ††	291	46.4	10.7
20204	GJ-23	213 ††	258 ††	518 ††	661 ††	499	65.8	380 ††	252 ††	1420 ††	683 ††	551 ††	169 ††
21088	DE-23					1000 ††	458 ††	910 ††	378 ††	940 ††	257	129 ††	135 ††
21088	DE-23	844 ††	590 ††	614 ††	802 ††								
21100	DE-24	87.1 ††	115	29.9	146	419	59.7	146 ††	97.8 ††	614	360 ††	41.2	64.3 ††
21178	DE-24	62	79	31	125	440	42	81	70	540 ††	250	32	9
21229	GI-24	60.2	98.3	33.4	135	536	52.5	97.2	85.6	635	278	50.2	20.6
21230	DE-24	57.3	72.9	35.2	128	270	35.3	91.6	139 ††	651	284	47.5	10.3
50004	DE-24	40 ††	21.8 ††	26.3	123	423	50.2	95.1	78	474 ††	208 ††	86.9 ††	26.5 ††
50005	GJ-23	74.7 ††	90	54.9 ††	103	5.66 ††	33	98.9	87	951 ††	451 ††	157 ††	68.6 ††
50011	DE-24	55.3	103	41	139	573	40.4	98	73.1	721	313	40.8	11.8
50012	DN-24	67	85	38	134	479	46	70	78	674	291	45	12
50014	DE-24	96.7 ††	182 ††	45.9	173 ††	493	39.1	83.3	70	650	297	43.3	18.9
50018	DE-24	57.1	60.4	33.2	108	551	50.9	48.4 ††	80.1	624	301	49.5	21.3
50020	GI-23	4550 ††								417 ††	752 ††		
50024	GJ-24	55	93	75 ††	122	563	85 ††	130	83	673	222 ††	118 ††	2
52495	GI-24	60.9	68.7	28.5	116	484	45	87.8	80.2	675	299	41.8	10.1
52565	DE-23					887 ††	25	117	147 ††	710	412 ††	203 ††	40 ††
52610	DE-24									680	280	42	10

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Silicon (%w/w) – Not Certified											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	**ASP 1902-2**	**ASP 1902-3**	**ASP 1902-4**	**ASP 1905-1**	**ASP 1905-2**	**ASP 1905-3**	**ASP 1905-4**	**ASP 1908-1**	**ASP 1908-2**	**ASP 1908-3**	**ASP 1908-4**
10156	GI-23									36.4 ††	9.94 ††	45.3 ††	40.4 ††
21088	DE-23	0.0145	0.051	0.040	0.020	0.0838	0.066	0.0551	0.0773	0.048	0.015 †	0.0665	0.053
21100	DE-24	0.0432 †	0.078	0.052	0.047 ††	0.176	0.128	0.0913 ††	0.122	0.0369	0.0289 ††	0.0358	0.0347
21178	DE-23	0.012	0.051	0.056	0.019	0.19	0.145	0.0413	0.16	0.048	0.002	0.087	0.055
50004	DE-23					0.072	0.064	0.046	0.073	0.056	0.003	0.072	0.088
50005	DE-23	0.0098 †	0.061	0.031	0.017	0.208	0.097	0.0596	0.171	0.0358	0.00148	0.0734	0.055
50008	ZZ-23	0.034 †	0.149 ††	0.284 ††	0.065 ††	2.57 ††	1.15 ††	0.086 ††	1.26 ††	0.118 ††	0.005	0.412 ††	0.266 ††
50018	DB-31	0.016	0.04	0.045	0.015	0.131	0.070	0.052	0.096	0.0422	0.0066	0.0783	0.052
52565	DE-23	0.015	0.071	0.061	0.021	0.028	0.007	0.0404	0.011	0.0088 †		0.0101	0.0116
52636	DE-23	0.015	0.071	0.061	0.021	0.109	0.109	0.0485	0.128	0.0415	0.00052	0.0377	0.03

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Sodium (mg/kg)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
22	DE-23	21.6	86.8	569	815	59.8	7160	292	2180	75.4	107	15300	237
8888	DE-23			600	880		7020	275	2150	160 ††	140 ††	14300	260 †
10156	GI-23	35.8	84.3	85.4 ††	87.1 ††	76	5800	263	1870	72.5	111	11900	217
10173	DN-24	22.2	88.8	606	853	68.9	6310	333	1940	82.7	105	14900	218
11079	DE-23	31.5	110	616	811					47.6	138 ††	13700	210
20204	GJ-23	65.6 ††	119	562	0.101 ††	60	6570	252	2480 †	300 ††	100	13200	200
21043	GJ-23	35.8	115	576	795	137 ††	6840	311	2070	96.9 †	119 †	12700	238
21088	DE-23	25.7	108	621	918 †	77.1	6760	283	2100	70.6	108	12000	216
21100	DE-24	28.7	97.5	614	941 ††	57.5	7800 †	302	2250	61.1	116	16000 ††	211
21178	DE-23	30	110	580	855	75.9	6040	289	2140	82	97	12300	220
21190	AD-09	29	111	574	845	79.9	6420	308	2430	70	164 ††	14400	314 ††
21193	GJ-11									170 ††	208 ††	14200	315 ††
21229	GI-23	25.1	90.1	598	839	61.9	7040	282	2310	68.7	103	13700	240
21230	DE-23	29.3	138 †	633	909 †	62.8	7640	248	1920	53.8	100	13500	212
21232	DE-23	0.002 ††	0.01 ††	0.05 ††	0.07 ††	60	7370	250	1920	70	100	13500	215
50004	DE-23	18.3	89.6	569	844	51.9	6740	280	2080	74.4	113	15200	239
50005	GJ-23	36.3	121	659	933 †	87.3 †	7740	325	3420 ††	84.4	102	14100	198
50008	GJ-23	54.3 ††	125	630	879	86.5 †	6550	303	2210	102 †	143 ††	14200	269 ††
50011	DE-23	26	93.2	600	817	58.5	6960	288	2190	62.5	108	13600	231
50012	DN-23	21	84	549	779	48	678 ††	243	2220	61	96	14700	200
50014	DE-23	10 †	80	607	830	60	7360	290	2290	57	103	15300	227
50017	DE-23	24.5	96.7	610	862	71.9	5960	243	1860	75	104	12700	202
50018	DE-23	26.4	101	604	836	64.4	6790	243	1950	68.7	101	13800	221
50020	GI-23		80.5	413 ††	680 ††	55.5	6510	268	1910	64.5	97	12900	206
50024	GJ-23	48 ††	107	646	824	68.2	6900	288	2140	59.6	104	13800	213
50025	GJ-23	0.0078 ††	0.015 ††	0.064 ††	0.089 ††	145 ††	6210	400 ††	0.224 ††	40 †	80 ††	11500 †	220
50027	DN-23	23	105	617	840	50	6700	263	2080	70	101	12000	213
50029	AD-23	22	189 ††	639	778	160 ††	6070	372 ††	1820	196 ††	97.2	13500	219
52283	GJ-23	10.8 †	109	640	857	214 ††	6760	281	2420	73.8	101	13900	221
52387	DE-09	5.61 ††	29.5 ††	451 ††	670 ††	6600 ††	3290 ††	444 ††	2050	22 ††	94.7	10600 ††	189
52491	GI-23	13.8	91.2	567	813	56.1	6770	270	2130	52	95	13000	189
52494	GG-23	31.3	150 ††	603	812	129 ††	6460	322	2040	68.4	105	13000	218
52495	GI-24	24.3	87.8	599	830	55.7	6970	282	2280	63	110	14000	242
52565	DE-23	56 ††	114	556	793	86.2 †	6310	312	2140	72.1	86.6 †	10000 ††	184
52610	GG-23									53	90	12900	190
52632	DE-11	20	90	640	390 ††	0.007 ††	0.677 ††	0.033 ††	0.207 ††	100 †	100	13000	200
52636	DE-23	37	95.5	552	829	79	6230	317	2030	128 ††	126 ††	10300 ††	189

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Sulphur (%w/w)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
22	DE-23	0.187	0.213	0.081	0.27	0.176	0.193	0.203	0.174	0.523	0.194	0.217	0.26
8888	DE-23	0.198	0.228	0.088	0.287	0.17	0.2 †	0.204	0.181	0.552	0.207 †	0.212	0.245
10156	GI-23	0.126 ††	0.138 ††	0.141 ††	0.142 ††	0.112 ††	0.112 ††	0.116 ††	0.111 ††	0.176 ††	0.123 ††	0.125 ††	0.131 ††
10173	DN-24	0.185	0.224	0.092	0.276	0.166	0.182	0.181	0.158	0.579 †	0.198	0.22	0.251
11079	DE-23	0.198	0.216	0.093	0.28					0.519	0.187	0.203	0.247
20204	GJ-23	0.173	0.201	0.077	0.24	0.164	0.168	0.183	0.17	0.524	0.193	0.212	0.268 †
21043	GJ-23	0.19	0.217	0.087	0.27	0.197 ††	0.211 ††	0.216 †	0.19	0.565 †	0.196	0.207	0.258
21088	DE-23	0.167	0.211	0.079	0.259	0.164	0.175	0.178	0.158	0.494	0.163	0.225	0.22 †
21100	CA-37	0.211 †	0.226	0.106 ††	0.29	0.188 ††	0.212 ††	0.214 †	0.194	0.529	0.213 †	0.226	0.274 ††
21178	DE-23	0.17	0.2	0.08	0.25	0.159	0.165	0.175	0.157	0.49	0.17	0.2	0.23
21229	GI-23	0.18	0.214	0.084	0.262	0.176	0.191	0.192	0.179	0.513	0.182	0.205	0.263
21230	DE-23	0.147 †	0.177 ††	0.071 †	0.212 ††	0.13 ††	0.14 ††	0.14 ††	0.128 ††	0.486	0.183	0.202	0.248
21232	DE-23	0.18	0.21	0.08	0.27	0.18	0.19	0.19	0.18	0.49	0.18	0.2	0.24
50004	DE-23	0.17	0.202	0.077	0.255	0.166	0.16 †	0.189	0.156	0.511	0.182	0.214	0.246
50005	GJ-23	0.176	0.205	0.086	0.249	0.152 †	0.167	1.7 ††	0.162	0.527	0.167	0.182	0.224 †
50008	GJ-23	0.191	0.221	0.088	0.265	0.173	0.187	0.191	0.168	0.567 †	0.204 †	0.227	0.271 †
50011	DE-23	0.191	0.214	0.088	0.267	0.171	0.185	0.186	0.17	0.494	0.184	0.201	0.248
50012	DN-23	0.178	0.216	0.084	0.26	0.165	0.18	0.183	0.164	0.527	0.186	0.205	0.251
50014	DE-23	0.181	0.203	0.087	0.266	0.172	0.186	0.187	0.168	0.471	0.176	0.195	0.235
50017	DE-23	0.171	0.2	0.083	0.252	0.151 ††	0.165	0.169	0.152	0.505	0.181	0.203	0.238
50018	DE-23	0.178	0.213	0.086	0.25	0.168	0.183	0.188	0.171	0.514	0.181	0.204	0.238
50020	GI-23	0.175	0.185 †	0.06 ††	0.235	0.205 ††	0.2 †	0.235 ††	0.195	0.65 ††	0.195	0.205	0.25
50024	GJ-23	0.162	0.214	0.076	0.245	0.172	0.187	0.193	0.172	0.507	0.166	0.203	0.238
50025	GJ-23	0.17	0.211	0.086	0.25	0.16	0.181	0.187	0.158	0.522	0.176	0.207	0.249
50027	DN-23	0.165	0.222	0.084	0.27	0.166	0.178	0.184	0.161	0.511	0.175	0.194	0.231
50029	CA-37	0.19	0.183 †	0.105 ††	0.257	0.164	0.181	0.161 †	0.153	0.447 †	0.184	0.195	0.242
52283	GJ-23	0.182	0.227	0.082	0.271	0.166	0.183	0.17	0.169	0.518	0.178	0.193	0.243
52384	DE-23	0.16	0.25 ††	0.09	0.25								
52491	GI-23	0.183	0.218	0.085	0.273	0.178	0.187	0.193	0.172	0.499	0.178	0.199	0.247
52494	GG-23	0.175	0.207	0.084	0.264	0.163	0.176	0.183	0.162	0.521	0.182	0.206	0.245
52495	GI-24	0.178	0.207	0.086	0.237	0.173	0.178	0.181	0.164	0.52	0.186	0.211	0.241
52508	GJ-30	0.31 ††	0.35 ††	0.25 ††	0.47 ††	0.21 ††	0.31 ††	0.36 ††	0.42 ††	0.67 ††	0.04 ††	0.61 ††	0.67 ††
52565	DE-23	0.205	0.253 ††	0.107 ††	0.328 ††	0.216 ††	0.26 ††	0.201	0.234 ††	0.451 †	0.155 †	0.182	0.206 ††
52610	GG-23									0.43 ††	0.17	0.19	0.23
52632	DE-30	0.46 ††	0.63 ††	0.28 ††	0.9 ††	0.168	0.21 ††	0.2	0.203 †	0.6 ††	0.21 †	0.24 ††	0.29 ††
52636	DE-23	0.205	0.253 ††	0.107 ††	0.328 ††	0.232 ††	0.262 ††	0.273 ††	0.277 ††	0.806 ††	0.381 ††	0.491 ††	0.612 ††

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Zinc (mg/kg)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	ASP 1902-2	ASP 1902-3	ASP 1902-4	ASP 1905-1	ASP 1905-2	ASP 1905-3	ASP 1905-4	ASP 1908-1	ASP 1908-2	ASP 1908-3	ASP 1908-4
22	DE-23	22.3	22.5	7.93	48.8	16.2	16.8	14.5	25.5 †	39	26.3	28.9	47.8 †
8888	DE-23	22.1	23.5	8.46	48.7	14.7	15.5	13.4	24	40.5	25.4	27.3	44.3
10156	GI-23	15.5 ††	18.6	20.2 ††	20.2 ††	21.6 ††	15.3	17.9 ††	21.9 †	33.9 †	21.8	25.1	37.2 ††
10173	DN-24	21.4	20.7	8.21	49.4	10 ††	15.1	10.3 ††	23	40.7	24.7	27.2	44.8
11079	DE-23	23.3		11.3 †	61.3 ††					39.5	24.1	26.4	43.7
20204	GJ-23	24.8	27.9 †	9.42	40.3	15.7	14.4	13	23.6	35.5	26.8	25.6	46.2
21043	GJ-23	19.6	19.1	7.04	42.2	13.4	13.8	11.2 †	21.3 †	36.9	22.7	26.8	40.3 †
21088	DE-23	20.5	22	7.46	45.4	13.7	13.4	11 †	23.4	37	26	25	43
21100	DE-24	19.8	21.1	7.86	42.6	14.8	15	12.6	23.2	37.2	23.3	25.5	43.7
21178	DE-23	23	23	9.2	51	15.2	15.1	13.1	24.1	38	24	27	45
21190	AD-13	18.9	22.8	7.6	46	15.7	11.9 ††	13.6	21 ††	53.4 ††	71 ††	94.9 ††	173 ††
21193	GJ-11									34.5	21.5	25.1	38.7 ††
21229	GI-23	22	20.8	8.37	45.5	14.7	15.7	12.9	24.9	38	24	27	44.8
21230	DE-23	18.4	19.3	7.37	39.7	13 †	13.8	11 †	20.9 ††	33.2 †	23.9	24.9	42.2
21232	DE-23	19.1	20.8	7.63	44.5	15.8	15.1	13.3	23.7	38	23	26.2	43.1
21234	GH-09	20.6	23.9	11.5 †	45.4					41.1 †	27.4 †	30.1 †	44.5
50004	DE-23	21.7	22.9	7.98	48	15.9	15.4	12.7	22.8	37.2	23.9	28.4	43
50005	GJ-23	35.2 ††	29.8 ††	20.6 ††	62.9 ††	15.8	16.1	13.1	23.3	43.2 ††	27.9 ††	30.7 ††	45.9
50008	GJ-23	22.4	23	9.42	47.3	15.6	16.3	13.6	24.4	36.7	24.1	26.5	43.2
50011	DE-23	21.6	21.9	8.72	45.3	14.8	15	13	23.7	37.1	23.4	26.2	43.5
50012	DN-23	19.4	22	7.55	44.6	14.8	15.4	12.8	23.8	38.1	23.4	26.6	43.5
50014	DE-23	19.9	21.6	9.15	46.5	16.2	16.6	13.9	25.4 †	38.3	23.4	26.3	43.1
50017	DE-23	21.2	20.8	8.74	46.5	17.4 †	18.2 †	15.5 †	28.2 ††	39.1	4.2 ††	27.6	44.1
50018	DE-23	21.6	22.3	8.56	46.4	15.2	15.4	13	23.6	38	24.2	27.2	43
50020	GI-23	19.5	19.1	5.7 ††	39.4 †	17.1	16.2	16 ††	25	13.6 ††	22.1	23.8	39.7 †
50024	GJ-23	23.2	25.7	9.3	49.4	16.1	16	14	25.4 †	37	24.3	26.5	42.5
50025	GJ-23	25.1	22.9	9.48	51.4	16.8	18.3 ††	19 ††	23.5	33 †	26	27	42
50027	DN-23	19.6	22.8	7.8	46.4	14.8	15.2	13.2	23.6	37.5	22.7	23.8	39 ††
50029	AD-23	23	22.4	8.99	52.8	14	12.7 †	13.2	23.2	37.8	24.4	26	45
52283	GJ-23	20.8	24.8	8.06	52.2	15.3	15.2	12.3	24.2	37.4	23.9	27.4	43.8
52384	DE-23	23.3	22.8	9.7	47.4								
52387	DE-09	24.1	26.1	9.69	34.9 ††	19.2 ††	13.6	11.5	23.7	36.9	24.1	28.3	44.8
52491	GI-23	20.9	30.2 ††	12.1 ††	46.7	12.7 †	13.5	10.4 ††	21.8 †	41 †	23	28	44
52494	GG-23	20.4	24.4	10.6	41.8	13.4	13.4	12	21.7 †	33.7 †	20.4 †	23.1 †	37.4 ††
52495	GI-24	21.1	21.1	8.48	45.5	15.5	15.3	13.3	24.5	39.1	24	27.7	45.3
52508	AE-23	23	24.9	10.8	48.5	8.77 ††	8.42 ††	7.48 ††	17.1 ††	41.5 †	29.7 ††	28.4	46.4
52565	DE-23	23.4	23	18 ††	59.8 ††	18.3 ††	18.7 ††	15 †	27.5 ††	34.9	21.1	24.4	39.6 †

Lab. Code #	Method Codes	Plant sample identification and values for 2019: Total Zinc (mg/kg)											
		February 2019 (Round 2)				*May 2019 (Round 5)*				*August 2019 (Round 8)*			
		ASP 1902-1	**ASP 1902-2**	**ASP 1902-3**	**ASP 1902-4**	**ASP 1905-1**	**ASP 1905-2**	**ASP 1905-3**	**ASP 1905-4**	**ASP 1908-1**	**ASP 1908-2**	**ASP 1908-3**	**ASP 1908-4**
52610	DE-24									38.5	23	26.5	44
52632	DE-11	19.6	13.5 ††	8.2	42.6	16.3	15.3	13.5	26.1 †	45 ††	26.8	30.8 ††	53.3 ††
52636	DE-23	26.2	23.9	10.3	55.4 ††	15.3	17.1	13.9	28.8 ††	35.7	25.2	24.8	37.9 ††
52639	DE-38									27.5 ††	20.9	24	37.4 ††