5/7/01-00491

May 07, 2001

Ms. Mary Cooke
US Environmental Protection Agency
1650 Arch Street
Philadelphia, PA 19103

Subject: Responses to Comments
Background Investigation Final Report
NAB Little Creek, Virginia Beach, VA
Navy Clean II Contract N62470-95-D-6007, CTO 148

Dear Ms. Cooke:

On behalf of LANTDIV, this letter provides responses to the comments that EPA provided on the Final Background Investigation Report for NAB Little Creek dated December 2000.

Comment:

1. Page ES-1 (Executive Summary): The statement is made that the objective of this background study is to establish concentrations of metals, pesticides, and PAHs. However, the 1999 work plan indicated that elevated concentrations of metals, VOCs, pesticides, and PAHs were detected in surface soils and groundwater. The reasons for these two different lists of chemicals is not clearly stated. Also, the document is not clear as to why TAL/TCL chemicals were not included in this background study.

Response:
All soil and groundwater samples were collected for analysis of TAL TCL chemicals, and all these compounds were included in the background study. Metals, pesticides and PAHs are compounds with the greatest potential for anthropogenic background conditions, and were the only compounds with a frequency of detection that warranted central tendency and upper bound statistical analysis. In contrast to pesticides (agricultural land use) or PAHs (roadways), there are no commonly known anthropogenic sources for constituents such as VOCs. Therefore background data would not be used to risk manage or eliminated a non-anthropogenic source constituent such as VOCs as a constituent of potential concern (COPC) if detected at a site.

Comment:

2. Page ES-1: The executive summary does not adequately address why this background study does not include surface water or sediment. Both of these media are important to ecological risk assessment.

Response:
The scope for the background investigation as funded by the Navy and developed by the Partnering Team with EPA approval of the work plan was limited to soil and groundwater. Ecological risk assessments are being addressed at individual Sites at NAB

Little Creek through communication and collaboration with the Navy, BTAG, the Partnering Team, and the Ecological Work Group.

Comment:

3. Page ES-1: The reasons for limiting the chemicals of concern to metals, pesticides, and PAHs needs to adequately discussed.

Response:
See response to Comment 1.

Comment:

4. Page ES-1: In the second paragraph, the phrase "[i]n order to establish background water quality..." needs to be changed to: "[i]n order to establish background groundwater quality...."

Response:
The typographical error is noted.

Comment:

5. Page ES-1 (see also section 4.0 - Statistical Analysis of Background Data): There is a reference to comparing the background data to EPA Region III residential risk-based concentration. These are human health risk criteria. This document does not offer a similar comparison of background data to ecological risk criteria, such as EPA Region III BTAG screening values for ecological risk assessment. The reasons for this lack of use of this background data set from an ecological risk perspective need to be adequately discussed.

Response:
See response to Comment 2. Additionally, as ecological risk assessments are conducted at individual sites, use of background data and comparisons to EPA Region III BTAG screening values will be conducted as appropriate and through communication and collaboration with the Navy, EPA, DEQ, BTAG, the Partnering Team, and the Ecological Work Group.

Comment:

6. Page 2-2, section 2.1 (Sampling Rationale and Sampling Locations): This section identifies 3 general categories of soil types at this federal facility. These are 1) dredged fill, 2) urban land State and urban land Tetotum, and 3) native State Loam and Tetotum Loam. Between these 3 general categories of soil there appear to be 5 soil types on NAB Little Creek: dredged fill, urban land State, urban land Tetotum, native state loam and native Tetotum loam. However, this document is not clear if the soil samples have been located in all 5 of these soil types or if the number of soil samples (native - 5, urban - 14, and fill - 10) per each of the 5 soil types is sufficient to allow comparisons with site specific data.

Response:
The approach to the background investigation was based on a review of the Soil Survey for Virginia Beach, aerial photographs of past land use, and current land use. Because State and Tetotum loam soils are very similar (both are deep well drained loam with similar permeability and available water capacity) and past and current land use is most relevant to the presence of potential anthropogenic sources, Partnering Team consensus was to consider State loam and Tetotum loam together as a "Native" soil type. Much of NAB Little Creek was identified as Urban land. State urban and Tetotum urban soils were considered together as a Urban soil type. To address EPA comments, the Soil Survey for Virginia Beach was re-reviewed and it was noted that Urban Udorthents soil should have been included in the Background Report along with State urban and Tetotum urban. The Soil Survey describes all these soils as deep nearly level and moderately to well drained soils in areas covered by buildings, structures, and parking. Additionally, the soil survey notes that in many areas these soils and urbanized areas are so intermingled that it was not practical to map them separately. The exclusion of identifying Udorthents Urban in the text of the report does not affect the approach and distribution of sampling locations or the statistical analysis of results.

It was also noted during the re-review of the soil survey that Udorthent loam soils were erroneously identified as Urban Udorthents. This misidentification was applicable to five locations (U01, U04, U06, U07, U09). Statistical analyses were conducted to determine if these soil samples should have been included with the data set for Native soils. Box plots were generated to compare the 4 soil types: Native, Urban, Fill, and Udorthents loam soils (Attachment 1). The Kruskal-Wallis test was used to determine if there is statistical difference among these 4 soil types as compared to the original three soil types. Table RTC-1 (attached) shows the revised Kruskal-Wallis test results for 4 soil types (Native, Urban, Fill, and Udorthents loam) adjacent to the original Kruskal-Wallis results reported in the Background Report. Review of the box plots and comparison of the Kruskal-Wallis test results for 4 soil types to the original results for 3 soil types are similar for all parameters except calcium. For all parameters except calcium, Udorthents loam does not overlap with Native soils and is more similar to Urban and Fill. For calcium, Udorthents loam is more similar Native soils. Because Udorthents loam is more similar to Urban and Fill soils, upper tolerance limits and central tendency estimates calculated with these samples included in the urban soil data set as presented in the Background Report are appropriate. It should also be noted that the majority of the areas identified in the soil survey as Udorthents loam are currently more characteristic of urban areas (buildings, structures, and parking).

Comment:

7. Also relating to soil types, the draft screening and baseline ecological risk assessment for SWMUs 7 and 8 indicates there are 14 discrete soil units identified within the limits of the base. There appears to be major differences between the number and identity of the soil units portrayed in the background study compared with those identified in the SWMU 7 and 8 document. These inconsistencies need to be corrected and adequately discussed in all the documents on NAB Little

Creek. The concerns raised in comment 6 above are made all the more important in light of this inconsistency in soil types and also need to be adequately addressed in all the NAB Little Creek documents.

Response:

Table RTC-2 (attached) identifies all the soil types at NAB Little Creek, background samples collected, and distribution on the Base. Of the 14 soil units noted in the draft screening baseline ecological risk assessment nine are soil units characteristic of the beach sands along the Chesapeake Bay where there are no SWMUs of concern. These soils do not warrant analytical or statistical analysis and inclusion in the background soil quality characterization. The remaining soils have all been addressed in the Background Study.

Comment:

8. Page 3-1, section 3.1.2.1 (dissolved metals): The statement is made that mercury was not detected in any sample. This section needs to clearly indicate if these samples were analyzed for mercury using low detection methodologies. The use of these low detection methodologies has been utilized at other federal facilities to get more accurate concentrations.

Response:

The detection limit for mercury was 0.2 ug/L. As outlined in the approved Master Project Plans for NAB Little Creek and the approved Final Site-Specific Project Plans for the Background Investigation, the analytical method used for mercury was CLP ILM04.

Comment:

9. Page 3-3 section 3.2.2 (Metals - Soils): The statement is made that metals detected in two or more background soil samples are presented in Table 3-2. Neither the text nor the table adequately discusses the reasons for the need for a chemical to be detected in two or more background samples before it is included in the background data set. These reasons need to adequately discussed in this section. The reasons why metals must be detected in two or more soil samples is made more confusing when in sections 3.2.4 and 3.2.5, respectively, SVOCs and pesticides/PCBs only have to be detected in one or more soil samples to be included in the background data set.

Response:
Table 3-2 shows results for all constituents detected in **one** or more samples. The reference to "2 or more samples" is a typographical error. All detected constituents were included in the background data set.

Comment:

10. Page 4-2, section 4.1.1 (Boxplot Analysis): The statement is made "...LBG-MW02 is the only well constructed in dredged fill material which may account for the fact that eight parameter maximums were reported for samples from that well. These data may be qualitatively reviewed as appropriate when evaluating groundwater at site in dredge fill." Considering the fact that only one well was located in dredged fill, this section needs to clearly discuss those appropriate situations when these data may be qualitative used. This discussion needs to clearly indicate the uncertainty associated with using a single sample.

Response:

When site evaluations are conducted at NAB Little Creek and background data is used in those evaluations to identify constituents of concern or as part of risk management, discussions on the use of the background data and any uncertainty associated with the data will be presented in the specific site evaluation documents.

Comment:

11. The following comments were submitted on the October 1999 draft Work Plan and Sampling and Analysis Plan for Soil and Groundwater Background Investigation. Based on the review of the final document, whether or not these comments have been adequately addressed is not clear. This document needs to clearly and adequately discuss these previous comments. These previous comments are:

    Comment:
    1. On page 1-1, the Introduction (section 1.0) indicated that elevated concentrations of metals, VOCs, pesticides, and PAHs have been detected in soils and groundwater. Yet, the 1991 background study (paragraph 3 on page 1-1) indicated that only subsurface soils and groundwater samples were taken and that the subsurface soil analyses included metals and moisture; while the groundwater analyses included metals, organics, TPH, TOC, and TOX. Because this previous data set does not appear to have analyzed for all of the standard contaminants, there will be difficulty in utilizing these data to direct the current data collection effort. The use of these previous data needs to be more adequately discussed in this document.

Response:

The background soil and groundwater data obtained in 1991 was not used to direct the data collection efforts. The available historical background data was reviewed for evaluation of data usability. These historical data did not meet the data quality objectives (e.g. appropriate analytical methods and detection limits) and were not used to supplement the background data set obtained from this background investigation.

Comment:

2. On page 2-1, the statement is made (section 2.0 Sampling Rationale and Sampling Locations) that the specific goal is to establish background concentrations of metals, pesticides, and PAHs in surface and subsurface soils and groundwater. This document does not clearly indicate if the list of potential contaminants has been limited to only these three categories of contaminants. If additional contaminants are discovered at individual sites and are not included in the background study then no relationship can be established.

Response:

Background concentrations were only established for those naturally occurring and anthropogenic compounds (metals, PAHs, and pesticides) for the purpose of comparison to site data to more accurately identify site related contaminants. The potential list of contaminants from a given source area may not be limited to metals, PAHs, and pesticides, however, other contaminants (e.g. VOCs) would be considered source related contaminants that would not be present under natural or anthropogenic conditions and would therefore not be compared to background conditions. Analysis of background samples for a full range of parameters was conducted to ensure that the background locations selected have indeed not been impacted from a potential site related source area.

Comment:

3. On page 3-2 (first paragraph) the statement is made that only one CERCLA site is located in the soil type State Loam and Tetotum Loam, but "...the collection of...background samples from State and Tetotum soils is not considered warranted for this background investigation." The reason for not including this soil type in the background study does not appear rigorous. The elimination of this soil type from the background study needs to be re-evaluated and the explanation needs to be rewritten.

Response:

The Background Investigation was jointly scoped by the Navy, EPA and DEQ during the Partnering process and included input from BTAG during the November 1999 Partnering meeting. Because only one SWMU was located in the Native soil, the Partnering Team reached consensus that the expense of more fully characterizing the Native soil quality was not warranted.

Comment:

4. In section 2.1 (Soil Sampling Locations), on page 3-2, the statement is made that surface soil samples will be from 0 to 0.5 feet and subsurface samples will be from 1 to 3 feet. A 2-foot composite sample will likely underestimate the maximum contaminant concentrations, therefore, the subsurface sample(s) need to be no more than half a foot in length. This may result in more than one subsurface soil sample being taken.

Response:
Following discussions with BTAG and EPA toxicologist during the November 1999 Partnering meeting, the Team reached consensus to collect subsurface samples from 1 to 3 feet below ground surface.

Comment:
5. On page 3-4, in section 2.1, there is a reference to the NAB Little Creek Master Project Plans. BTAG has not had an opportunity to review this document.

Response:
Noted

Comment:
6. In section 2.2 (Groundwater Sampling Locations), page 3-4, the statement is made that "All background wells monitor groundwater in the shallow Columbia Aquifer at depths less than 20 feet." There is no reference to groundwater samples in deeper aquifers. This apparent omission needs to be adequately explained.

Response:
Because no contamination has been found in the deeper aquifer at the most contaminated sites at NAB Little Creek, the Partnering Team reached consensus that it was not necessary to establish background groundwater quality for the underlying deeper aquifers.

Comment:
7. According to section 3.2.2 (Field Sampling Activities), page 3-6), there are to be 8 groundwater samples, 24 surface soil samples, and 24 subsurface soil samples. There is no indication that these sample sizes are sufficient to support the statistics proposed in this document. The justification for these samples sizes needs to be discussed in this section.

Response:
The Background Investigation was jointly scoped by the Navy, EPA and DEQ during the Partnering process with Team consensus that a minimum of eight samples would be required for statistical analysis.

10

Comment:
8. Regarding groundwater sampling, this document suggests that this is to be a one-time event (see Table 3-1 on page 3-7). This data collection effort will not address seasonal variations in contaminant concentrations nor will it address tidal influences. These issues will need to be addressed.

Response:

It was acknowledged during the November 1999 Partnering meeting that a second round of groundwater samples would be collected to supplement the background groundwater data. A second round of background groundwater samples is scheduled for June 2001.

Comment:

9. The data evaluation section (3.4) needs to be rewritten. Concerns with this section include:

a. The conditions under which an outlier will be removed from the data set needs to be clearly understood and agreed to. If the sampling data points are agreed to by everyone, and we believe them to be valid, then there is less reason to eliminate data from consideration regardless of its value.

Response:
As stated in the Final Work Plan for the Background Investigation, "A measurement will not be deleted from a data set solely on the basis of a statistical outlier."

b. The selection of an adequate number of sample locations depends upon desired levels of confidence and power of the data as well as an acceptable variability in the data. If these are not acceptable, additional data needs to be collected. These concepts need to be adequately addressed in this document.

Response:
Noted

b. The statement is made that the upper limit of the background concentration may be established by "...calculating the mean background concentration plus three standard deviations...." At a minimum, support for this methodology must be documented in the text.

Response:
Summary statistics for background data included frequency of detection, minimum, maximum, and mean concentrations. Three standard deviations about the mean concentration was not determined for the background data.

c. The upper limit of the background concentration may be established by "...calculating the upper tolerance limit at the 95% probability level." Again, support for this methodology must be documented in the text.

Response:

The upper tolerance levels define an upper bound of concentrations that could be expected (95% probability) in areas un-impacted by the facility. It is reasonable to use the upper tolerance levels in conjunction with background central tendency estimates for comparison to site data to evaluate site-related releases. Use of these statistics are consistent with environmental industry practices and was agreed to by the Partnering Team.

e. Another recommendation would be to utilize a statistical test to compare one data set (site related) to another data set (background). This may involve calculating the 95% upper confidence level of the arithmetic mean of the data set.

Response:
Noted

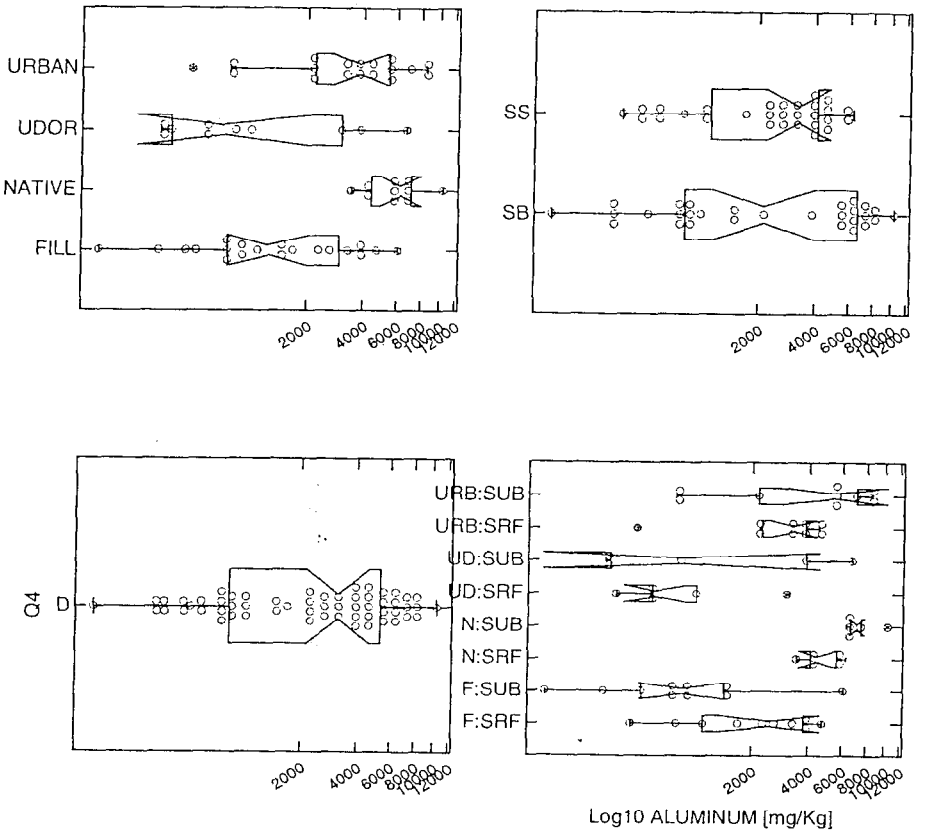
NAB Little Creek
Background Investigation
Soil Types

USDA Soil ID	USDA Soil Type	Soil Description	Background Samples Collected	Comments
3	Augusta Loam	poorly drained loam on low inland ridges and side slopes	None	Comprises < 1% of NAB, no SWMUs in this native soil
6	Beaches	Sandy material deposited by wave action	None	Comprises <1% of NAB, restricted to narrow strip along Cheaspeake Bay, no SWMUs in this native soil
10	Corolla fine sands	poorly to moderately well drained soils	None	Comprises < 1% of NAB, restricted to small area dunes near Little Creek inlet to Bay, no SWMUs in this native soil
15	Duckston fine sand	deep nearly level poorly drained	None	Comprises <1% of NAB, restricted to small area adjacent to Lake 3, no SWMUs in this native soil
22	Newhan fine sand	undulating to steep, excessively well drained	None	Comprises < 1 % of NAB, restricted to sand dunes areas along Chesapeake Bay, no SWMUs in this native soil
23	Newhan Corolla fine sand	Deep well drained soil in coastal area	None	Comprises < 1% of NAB, restricted to small area dunes near Little Creek inlet to Bay, no SWMUs in this native soil
30	Undulating Psamments	well drained sandy soils where sand dunes have been disturbed	None	Comprises < 2 % of NAB, restricted to sand dunes areas along Chesapeake Bay, no SWMUs in this native soil
31	Psamments Urban	Areas disturbed by grading, filling, structures, parking	None	Comprises < 1 % of NAB, restricted to mouth of Little Creek inlet and small area along Varian Lake, no SWMUs in this native soil
32	Rappahannock mucky peat	saline, deep, nearlylevel, poorly drained soil	None	Comprises < 1 % of NAB, restricted to small area north of Site 8 in marsh, no SWMUs (except Site 8) near these native soils
36	Tetotum Loam	deep well drained and moderately well drained soils on low ridges and side slopes	N02, N03, N05	Comprises about 10 % of NAB, two areas: one area north of Gator Blvd and west of Lake 1;one area between Gator Blvd. and Amphibious Dr. near Gate 4 towards School of Music ; SWMUs 76, SWMU 41, AOC H are in this soil, with the exceptuon of AOC H, these SWMUs are NFA and AOC H is desktop review. (This soil type is present in a narrow band behind the School of Music.
34	State Loam	Deep nearly level well drained	N01, N04	Comprises about 10 % of NAB; an area along Amphibious Dr. (camp ground) between Helicoptor Rd and Gate 5, residential area along lake Bradford, one very small area near Lake Whitehurst; AOC B is in this soil in the Camp Ground area
40	Udorthents loams	deep well drained and moderately well drained soils area altered during excavation or covered by fill materials	U01, U04, U06, U07, U09,	Comprises about 20% of the western side of NAB (most of these areas are now urban, i.e. covered by buildings, parking, grading or filling). These soils occur in the northwest peninusla of NAB, wooded area south of Desert Cove, and between Little Creek Cove and Shore Drive
41 & 42	Udorthents Urban (41) Urban Land (42)	Deep nearly level well drained, Areas disturbed by grading, filling, structures, parking (41); areas where more than 80 % of surface is structures, building, parking	U02, U03, U05, U08, U10, U11, U12, U13, U14	Comprises about 50 % of NAB and occurs throughout the base in areas with roads, structures, landscaped and graded, residential.

Table RTC-1
Analysis of Reclassification of Udorthent Loam Soils
NAB Little Creek Background Investigation Response to Comments

	Number of Samples	Frequency of Detection	Kruskal-Wallis Result for Depth	Kruskal-Wallis Result for 3 Soil Types	Kruskal-Wallis Result for 4 Soil Types	Comparison of Native and Udorthents Loam
METAL						
Aluminum	58	1.00	0.54	0.001	0.000	N>UDOR
Arsenic	57	0.61	0.64	0.01	0.04	N>UDOR
Barium	58	0.98	0.41	0.001	0.000	N>UDOR
Beryllium	58	0.71	0.77	0.001	0.000	N>UDOR
Calcium	**58**	**1.00**	**0.10**	**0.13**	**0.04**	**N~UDOR**
Chromium	58	1.00	0.79	0.006	0.001	N>UDOR
Cobalt	58	0.76	0.44	0.002	0.000	N>UDOR
Iron	58	1.00	0.18	0.003	0.001	N>UDOR
Lead	58	1.00	0.001	0.63	0.44	NA
Magnesium	58	1.00	0.38	0.02	0.002	N>UDOR
Manganese	58	1.00	0.49	0.002	0.000	N>UDOR
Nickel	58	0.69	0.18	0.002	0.001	N>UDOR
Potassium	58	0.67	0.59	0.001	0.001	N>UDOR
Sodium	58	0.53	0.10	0.001	0.001	N<UDOR
Vanadium	58	1.00	0.14	0.005	0.011	N>UDOR
Zinc	58	0.97	0.001	0.68	0.63	NA
PESTICIDE/PCB						
4,4'-DDE	58	0.40	0.40	0.06	0.10	NA
4,4'-DDT	58	0.43	0.03	0.12	0.18	NA
WET CHEMISTRY						
TOC	30	1.00	0.09	0.44	0.27	NA
pH	30	1.00	0.95	0.10	0.20	NA

Notes:
N= Native
UDOR= Udorthents Loam
F=Fill
U=Urban
SRF= Surface
SUB= Subsurface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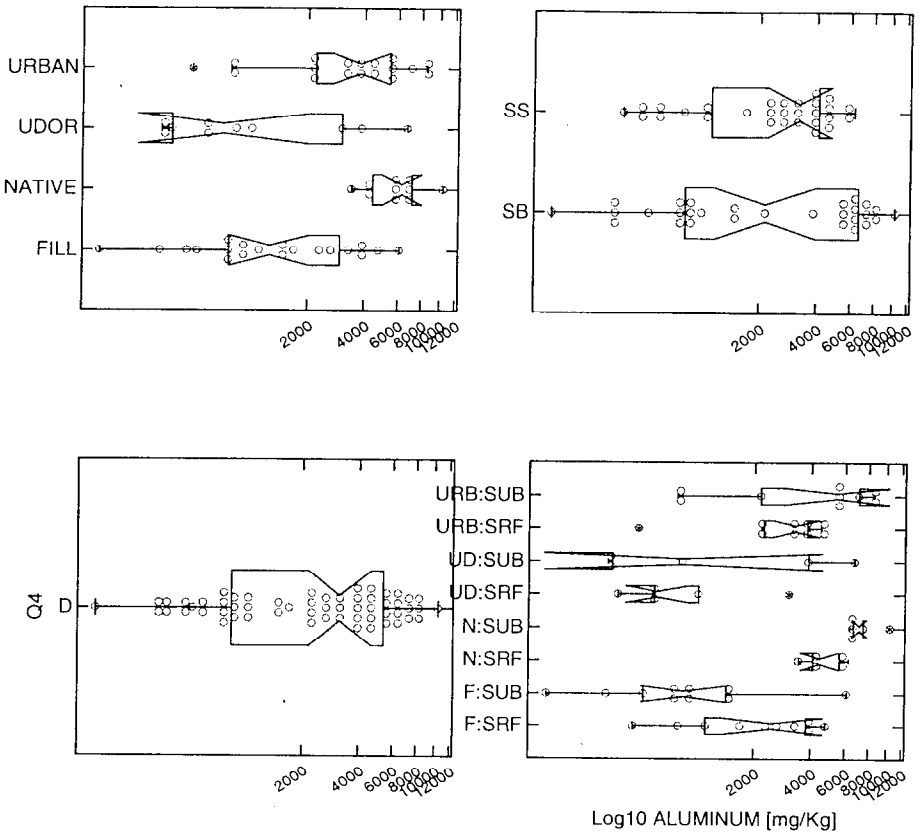
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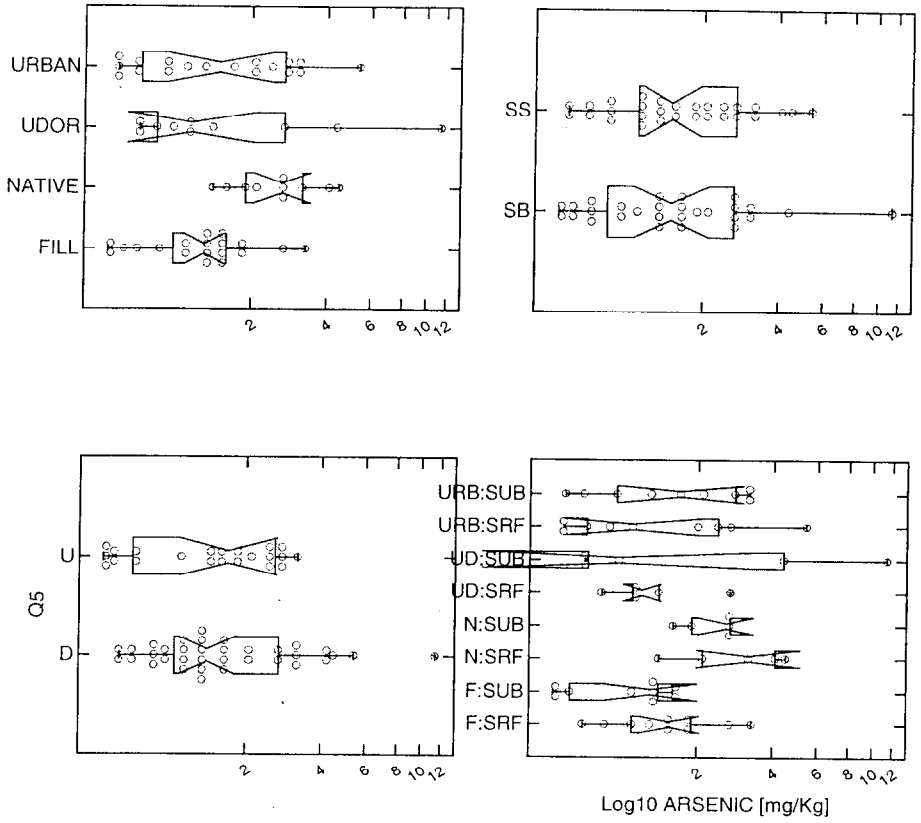
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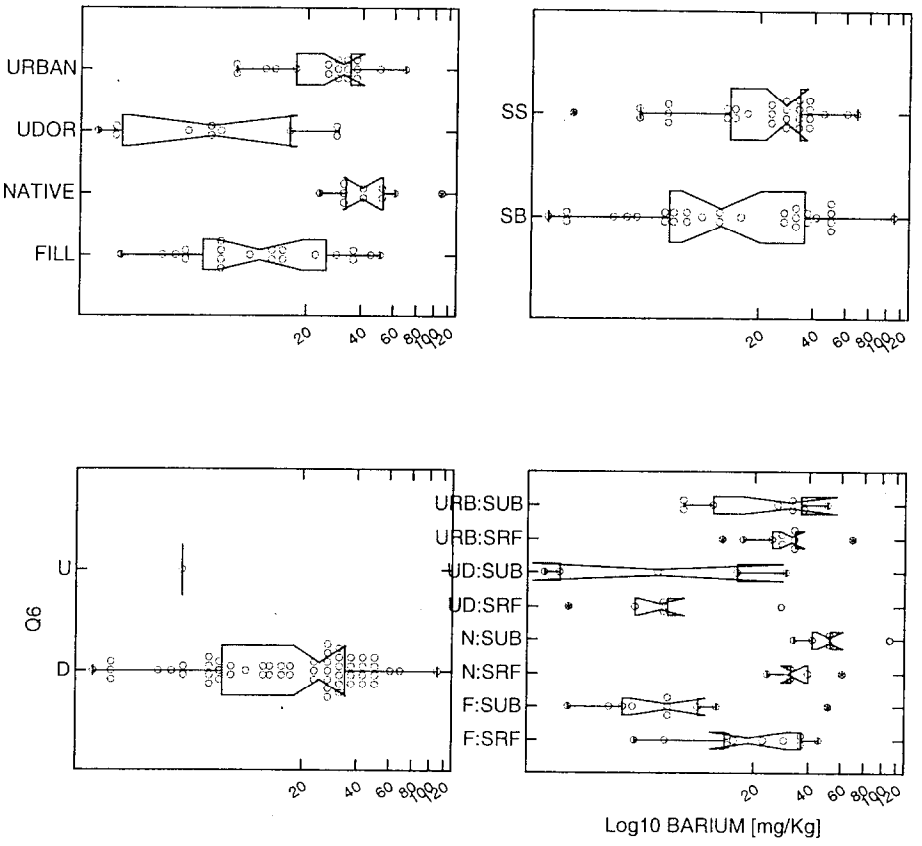
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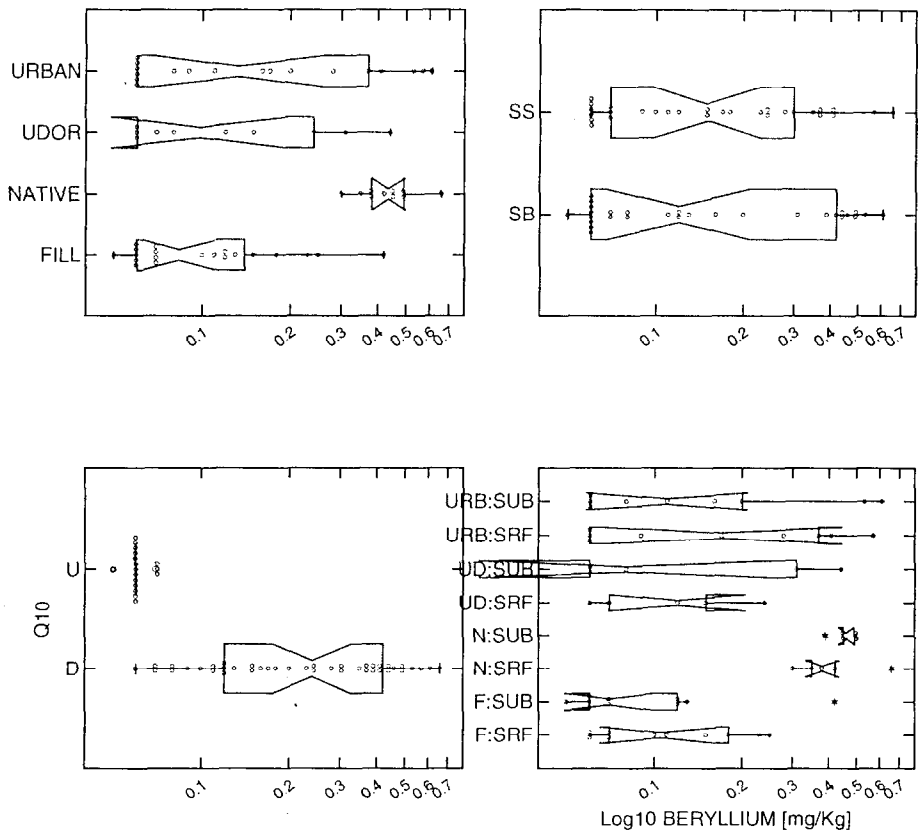
Log10 BARIUM [mg/Kg]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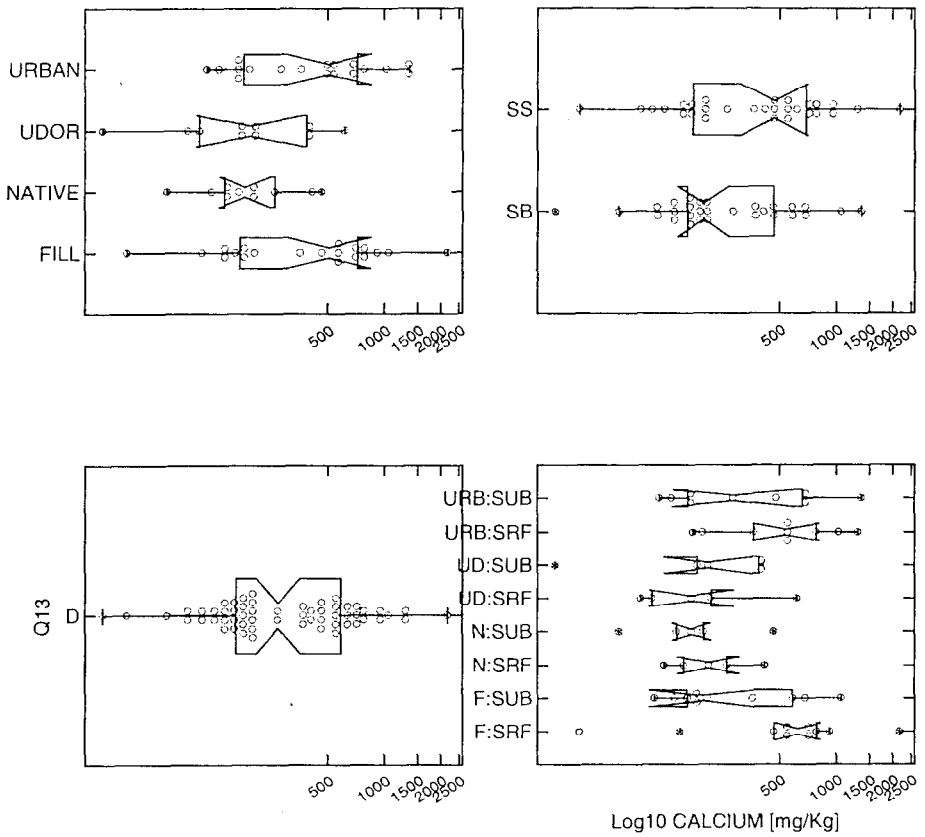
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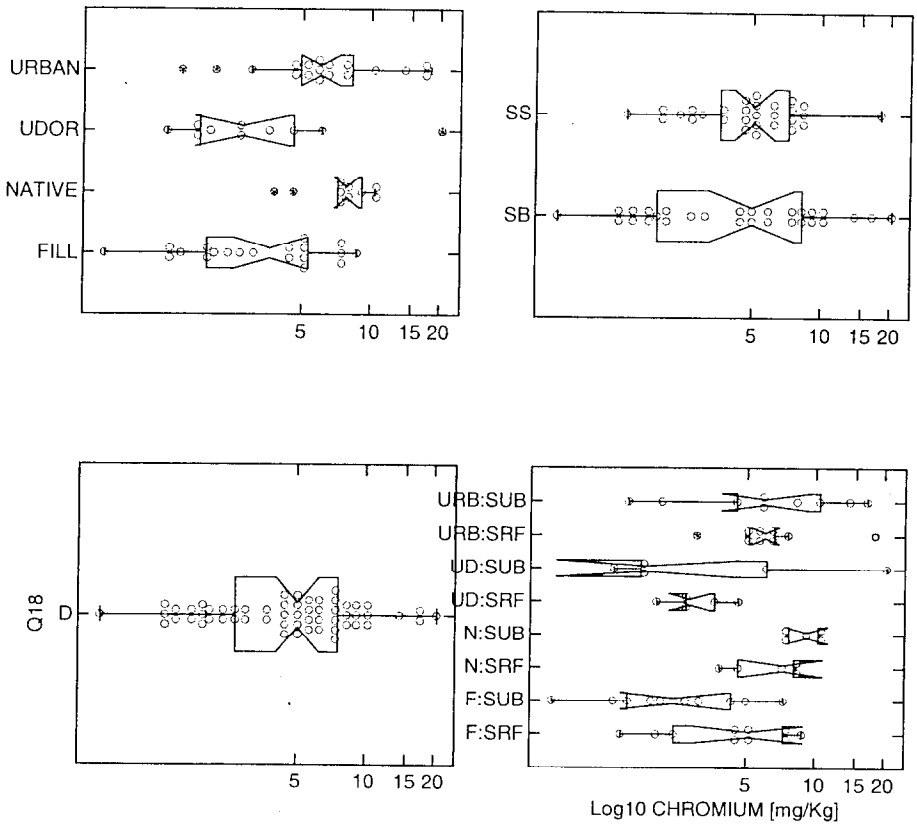
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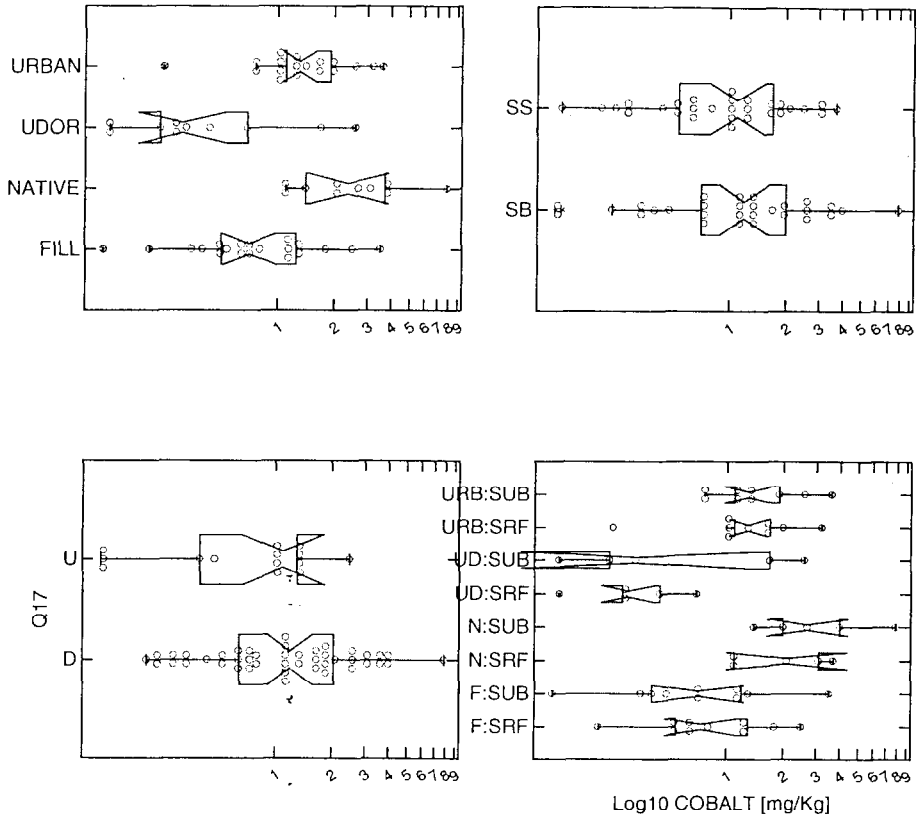
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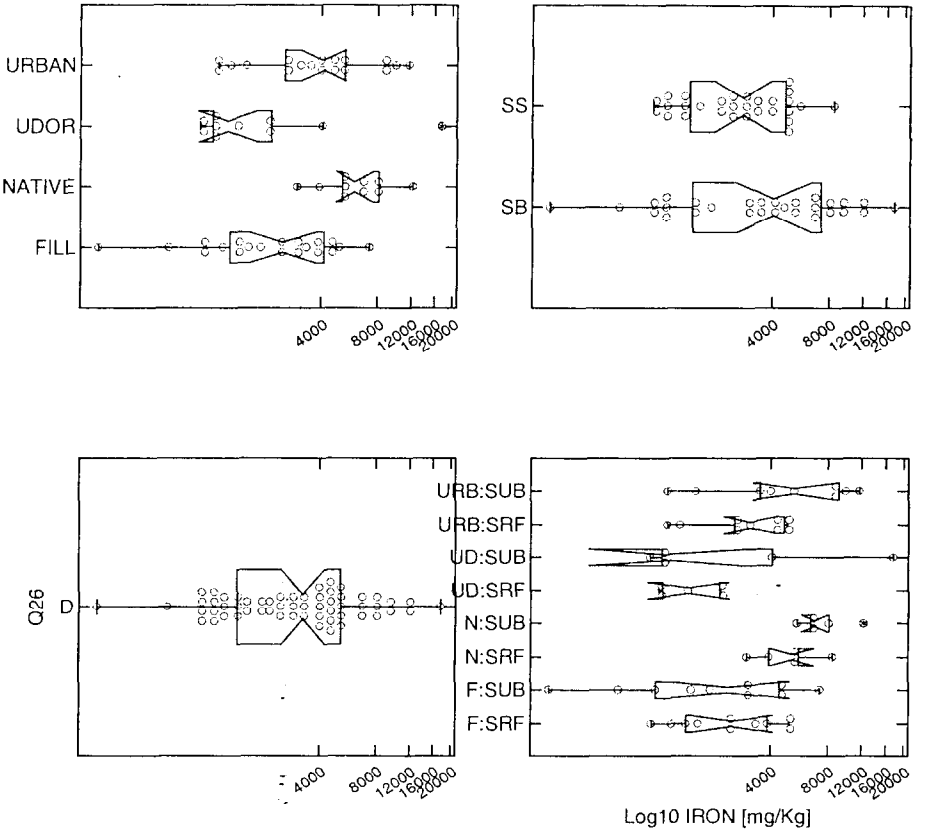
Log10 COBALT [mg/Kg]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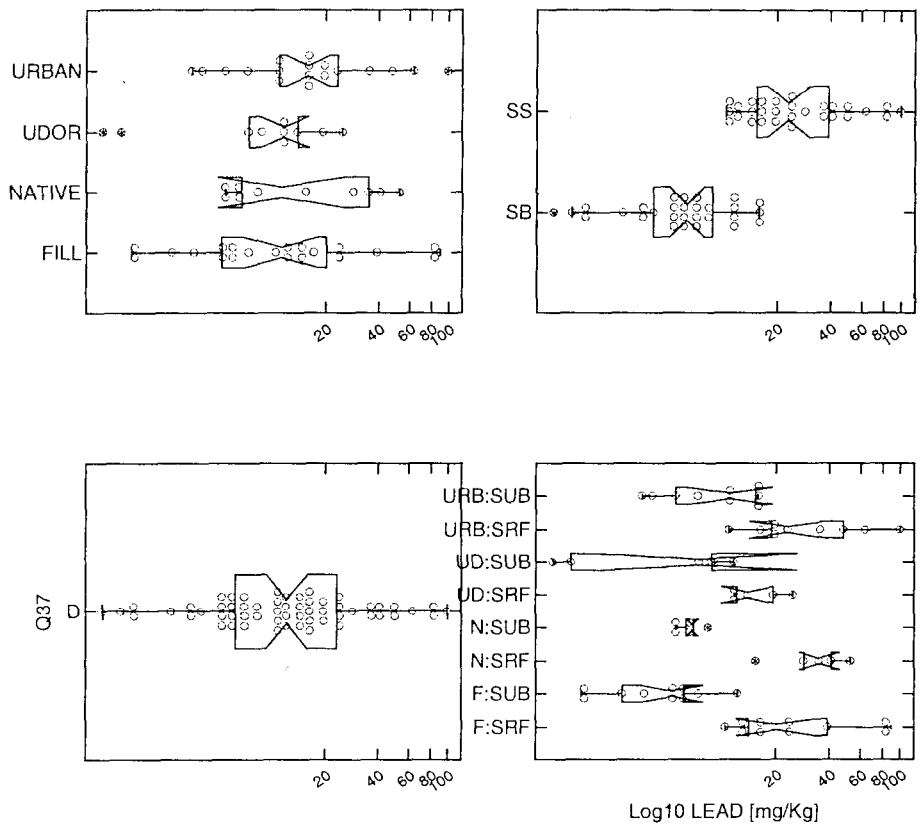
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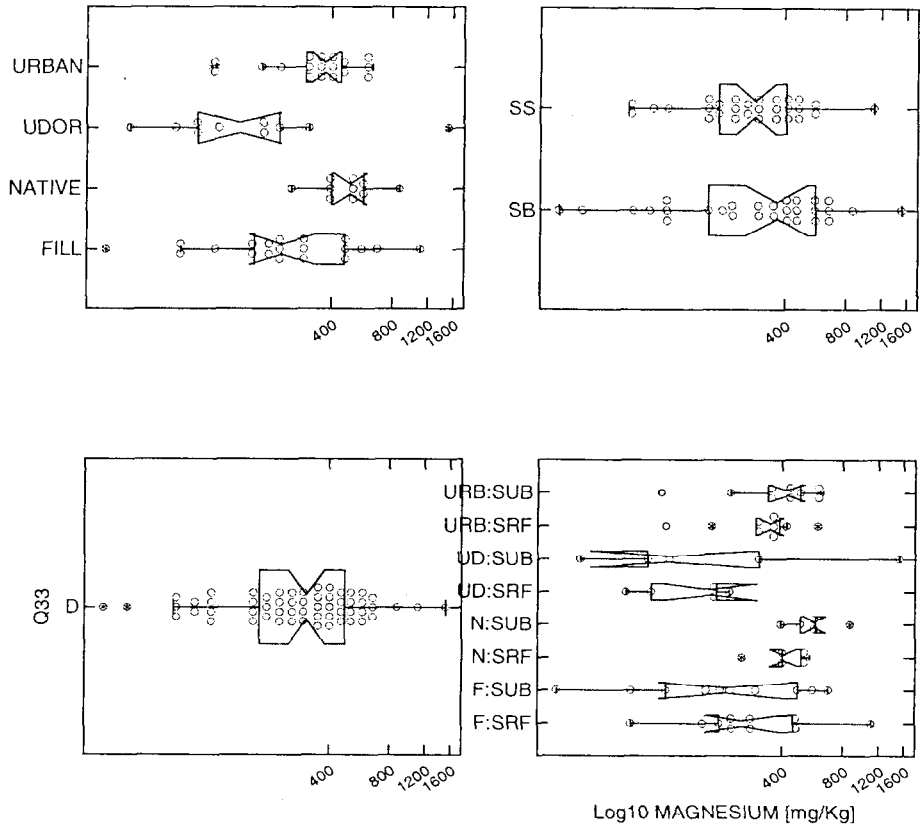
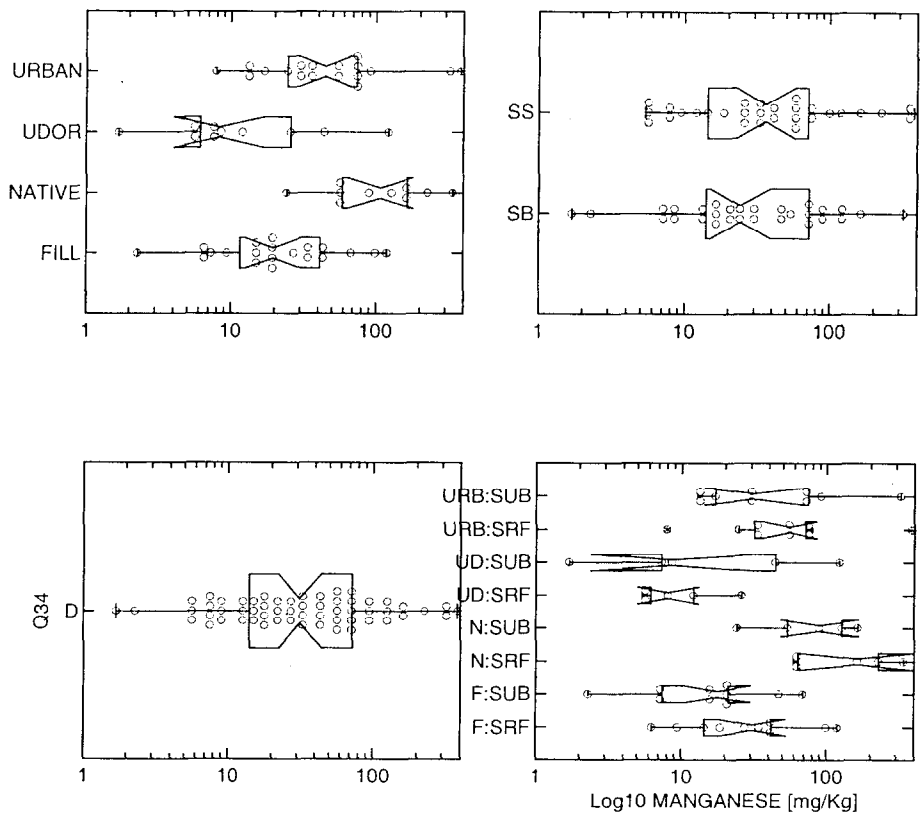
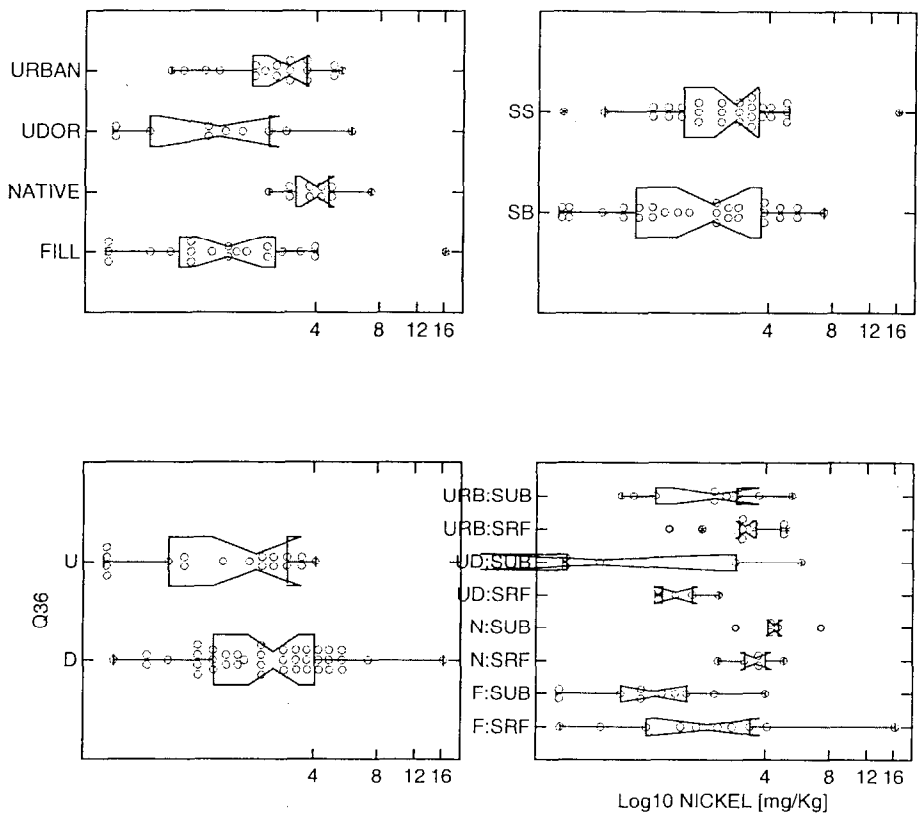
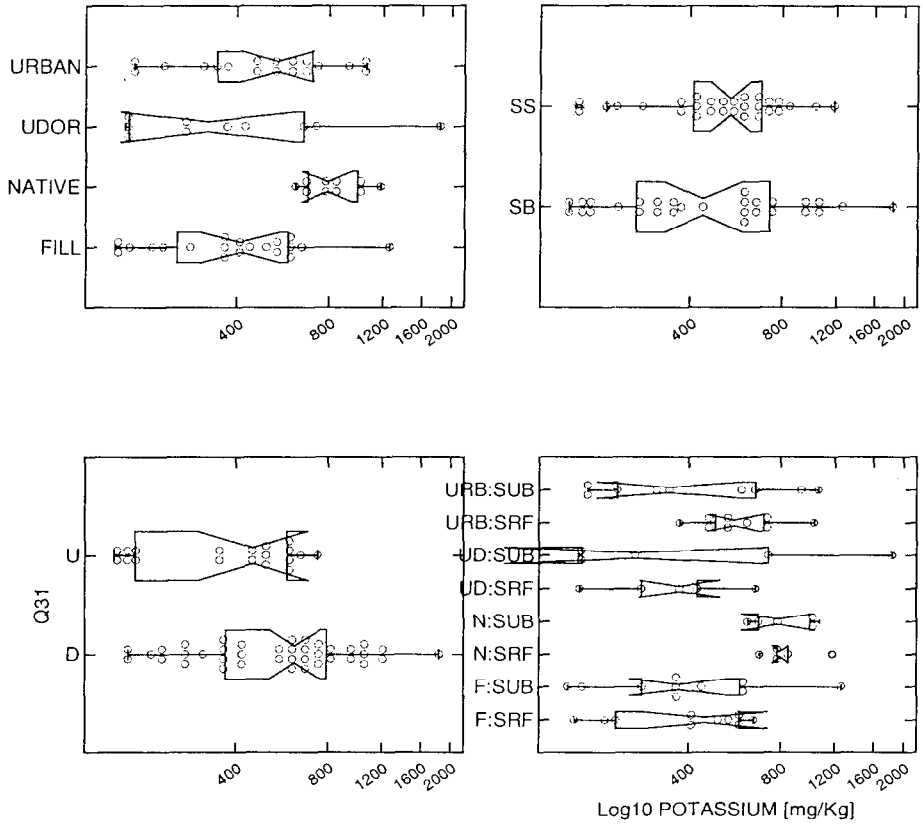
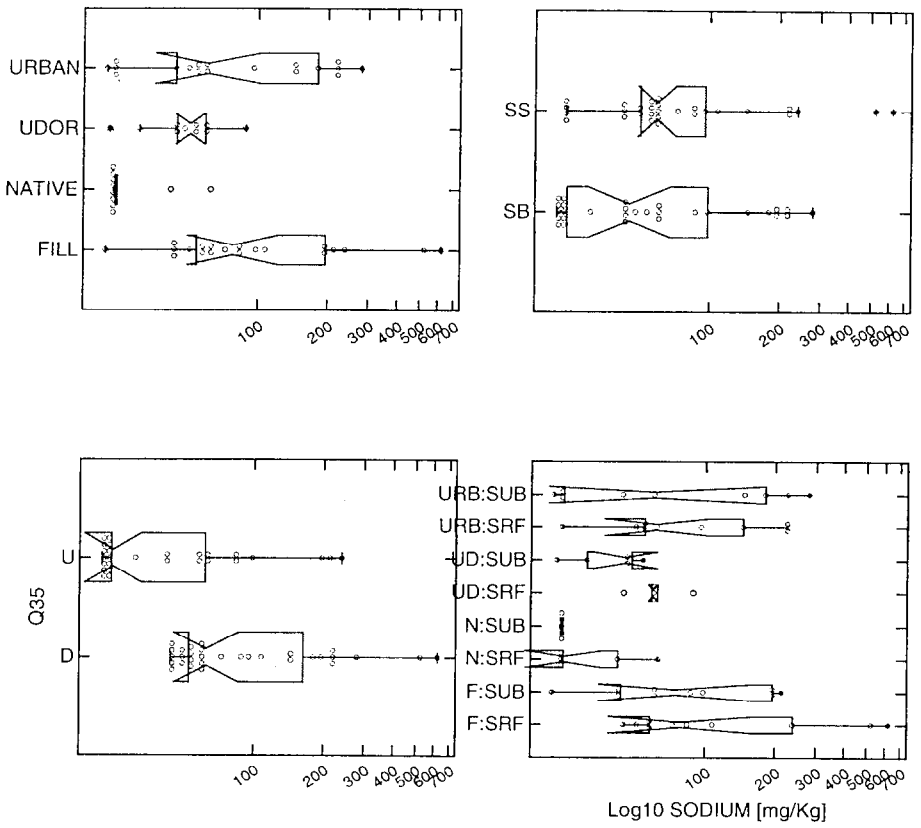
SB
20
40
60
80
100
Q37
D
20
40
60
80
100
URB:SUB
URB:SRF
UD:SUB
UD:SRF
N:SUB
N:SRF
F:SUB
F:SRF
20
40
60
80
100
Log10 LEAD [mg/Kg]

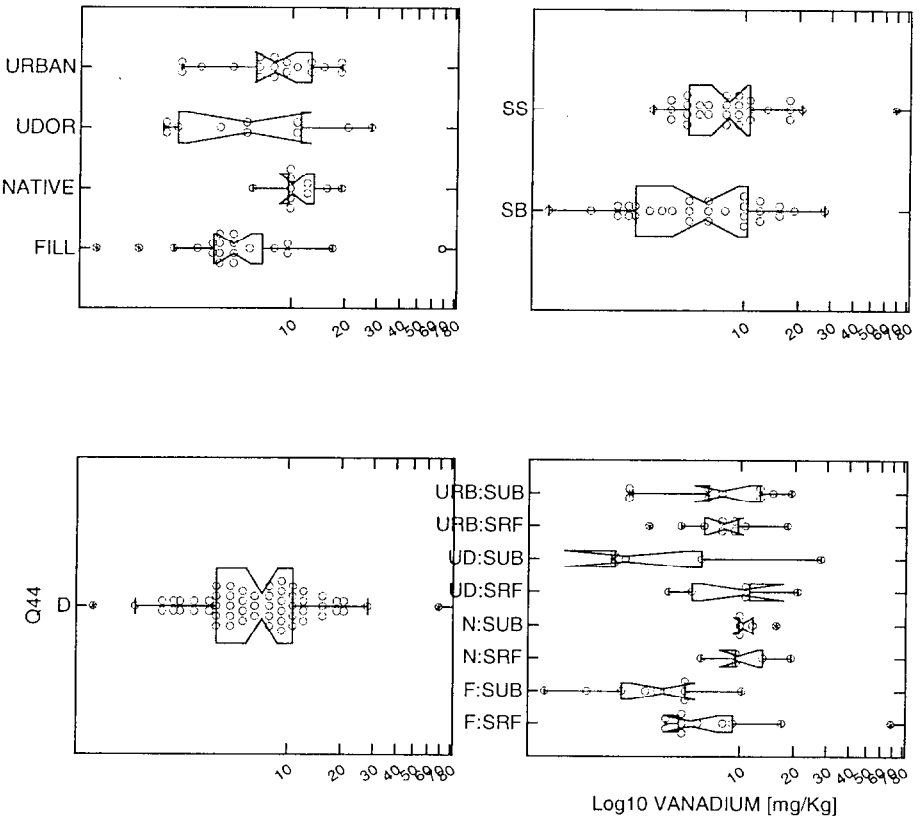

URBAN
UDOR
NATIVE
FILL
400
800
1200
1600
SS
SB
400
800
1200
1600
Q33
D
400
800
1200
1600
URB:SUB
URB:SRF
UD:SUB
UD:SRF
N:SUB
N:SRF
F:SUB
F:SRF
400
800
1200
1600
Log10 MAGNESIUM [mg/Kg]

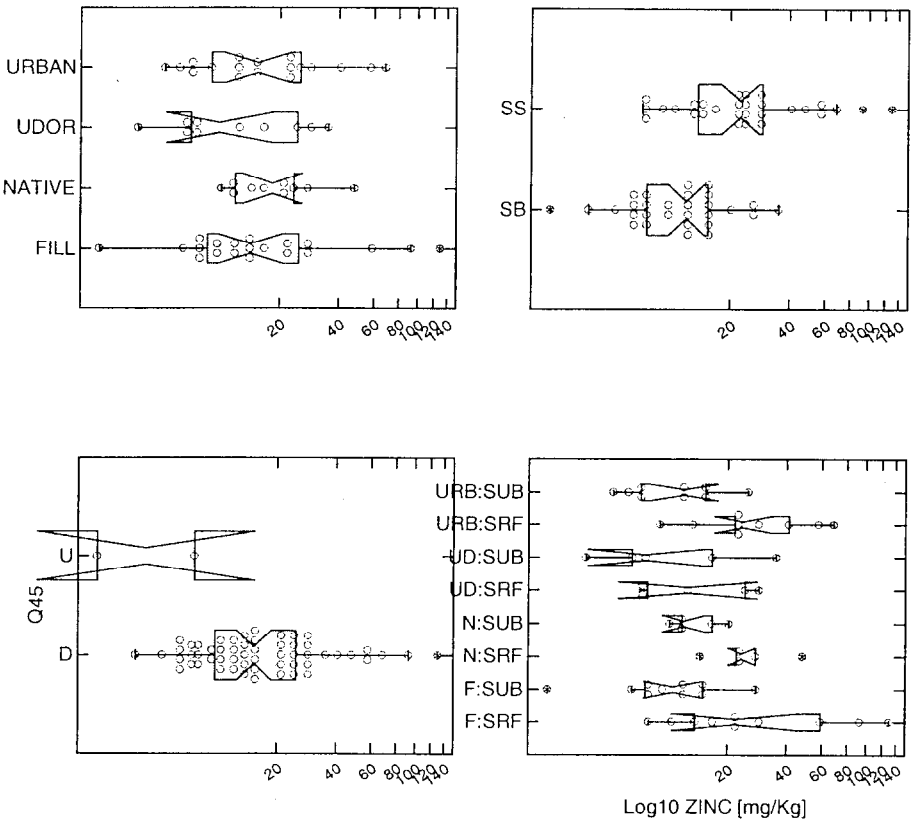

URBAN
UDOR
NATIVE
FILL
1
10
100
SS
SB
1
10
100
Q34
D
1
10
100
URB:SUB
URB:SRF
UD:SUB
UD:SRF
N:SUB
N:SRF
F:SUB
F:SRF
1
10
100
Log10 MANGANESE [mg/Kg]

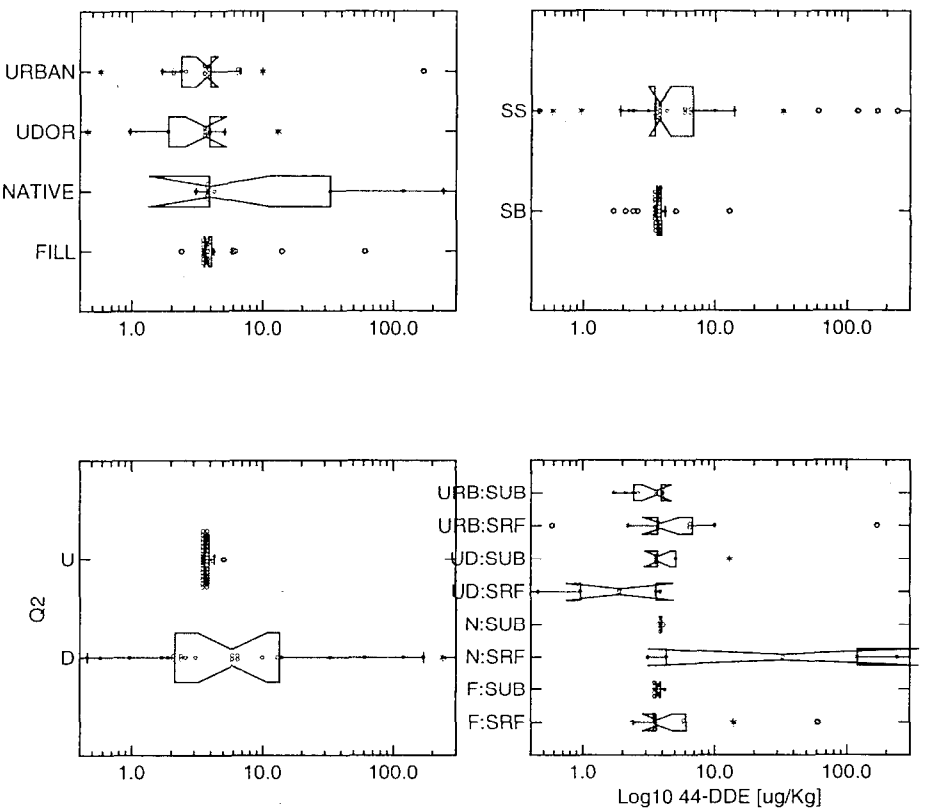

URBAN
UDOR
NATIVE
FILL
4
8
12 16
SS
SB
4
8
12 16
Q36
U
D
4
8
12 16
URB:SUB
URB:SRF
UD:SUB
UD:SRF
N:SUB
N:SRF
F:SUB
F:SRF
4
8
12 16
Log10 NICKEL [mg/Kg]

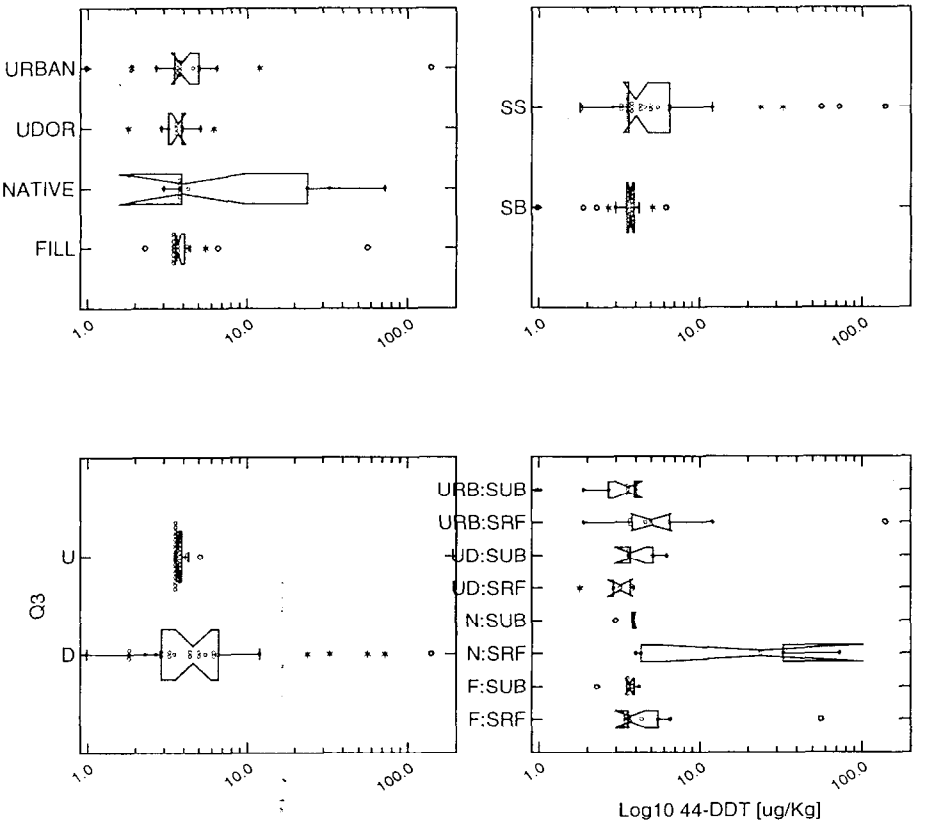

URBAN
UDOR
NATIVE
FILL
400
800
1200
1600
2000
SS
SB
400
800
1200
1600
2000
Q31
U
D
400
800
1200
1600
2000
URB:SUB
URB:SRF
UD:SUB
UD:SRF
N:SUB
N:SRF
F:SUB
F:SRF
400
800
1200
1600
2000
Log10 POTASSIUM [mg/Kg]

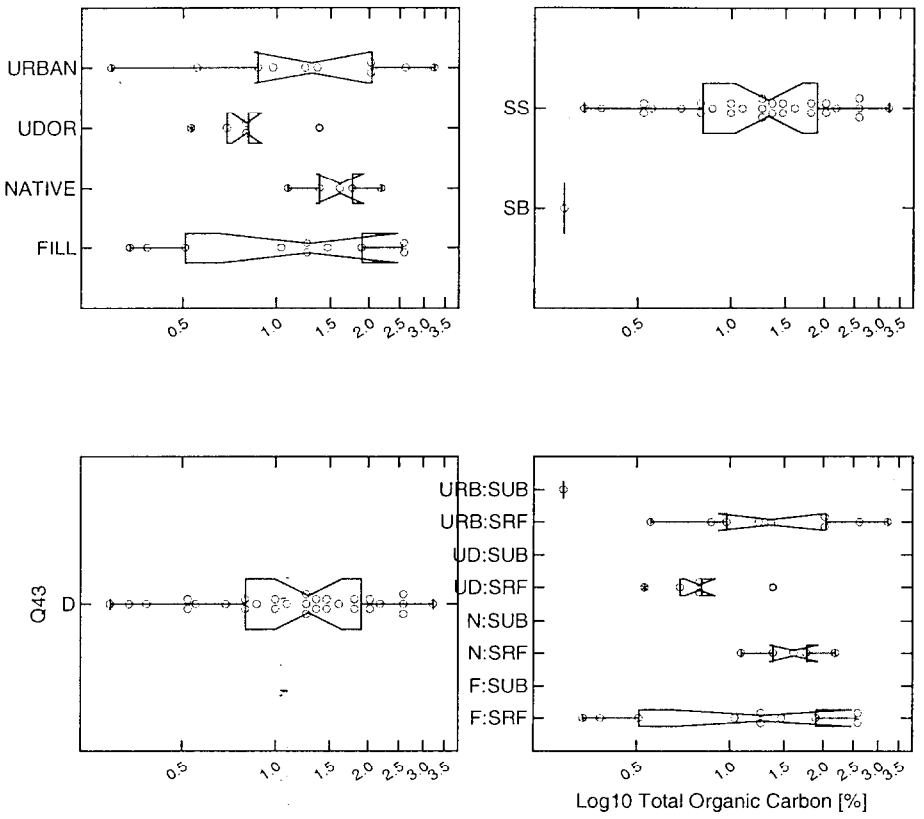

URBAN
UDOR
NATIVE
FILL
SS
SB
Q35
U
D
URB:SUB
URB:SRF
UD:SUB
UD:SRF
N:SUB
N:SRF
F:SUB
F:SRF
100
200
300
400
500
600
700
Log10 SODIUM [mg/Kg]

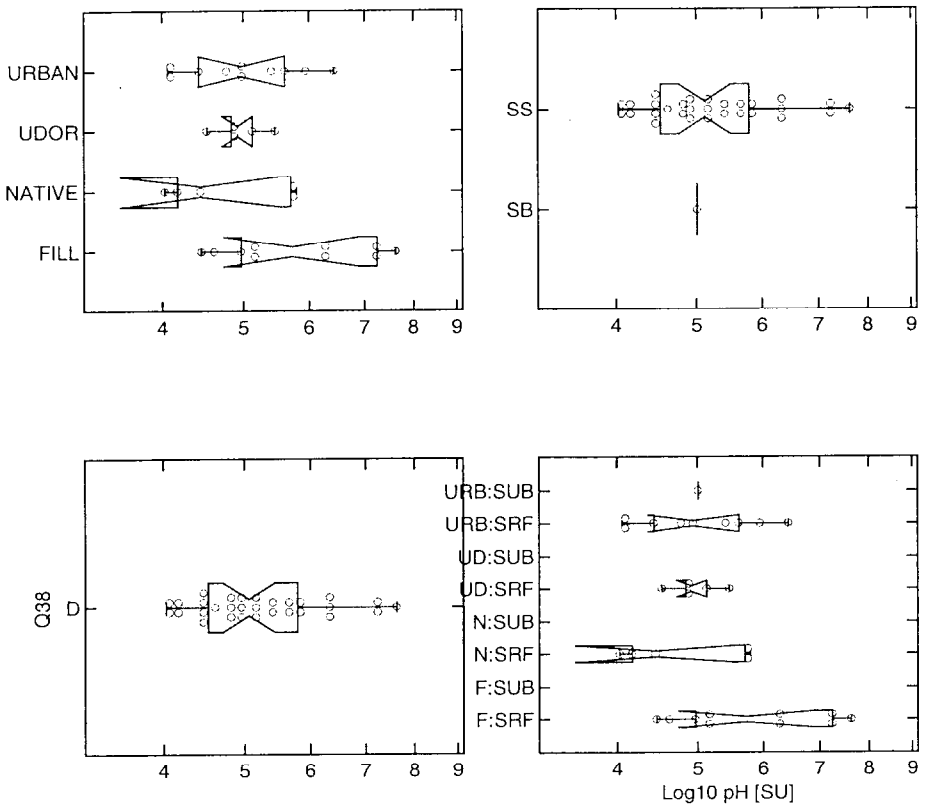

URBAN
UDOR
NATIVE
FILL
SS
SB
Q44
D
URB:SUB
URB:SRF
UD:SUB
UD:SRF
N:SUB
N:SRF
F:SUB
F:SRF
10
20
30
40
50
80
90
100
Log10 VANADIUM [mg/Kg]


URBAN
UDOR
NATIVE
FILL
20
40
60
80
100
120
140
SS
SB
20
40
60
80
100
120
140
Q45
U
D
20
40
60
80
100
120
140
URB:SUB
URB:SRF
UD:SUB
UD:SRF
N:SUB
N:SRF
F:SUB
F:SRF
20
40
60
80
100
120
140
Log10 ZINC [mg/Kg]


URBAN
UDOR
NATIVE
FILL
1.0
10.0
100.0
SS
SB
1.0
10.0
100.0
Q2
U
D
1.0
10.0
100.0
URB:SUB
URB:SRF
UD:SUB
UD:SRF
N:SUB
N:SRF
F:SUB
F:SRF
1.0
10.0
100.0
Log10 44-DDE [ug/Kg]


URBAN
UDOR
NATIVE
FILL
1.0
10.0
100.0
SS
SB
1.0
10.0
100.0
Q3
U
D
1.0
10.0
100.0
URB:SUB
URB:SRF
UD:SUB
UD:SRF
N:SUB
N:SRF
F:SUB
F:SRF
1.0
10.0
100.0
Log10 44-DDT [ug/Kg]


URBAN
UDOR
NATIVE
FILL
SS
SB
Q43
D
URB:SUB
URB:SRF
UD:SUB
UD:SRF
N:SUB
N:SRF
F:SUB
F:SRF
0.5
1.0
1.5
2.0
2.5
3.0
3.5
Log10 Total Organic Carbon [%]


URBAN
UDOR
NATIVE
FILL
SS
SB
Q38
D
URB:SUB
URB:SRF
UD:SUB
UD:SRF
N:SUB
N:SRF
F:SUB
F:SRF
4
5
6
7
8
9
Log10 pH [SU]