Programme Area: Bioenergy

Project: Characterisation of Feedstocks

Title: D6 Final Report (Phase 1) Appendix 10 Part 3

Abstract:

The primary objective of this 2015/16/17 Project was to provide an understanding of UK produced biomass properties, how these vary and what causes this variability.
This document is one of the appendices to the Final Report from the first Phase (2015/16) of the Characterisation of Feedstocks (CofF) project, Deliverable D6. D6 is provided in a number of parts consisting of the main body text plus 13 Appendices, provided in 17 files. These 13 appendices are provided in 12 pdf files plus 46 data files in Microsoft Excel format. The purpose of this report plus its related parts is to report the variability in feedstock properties of UK produced energy biomass, the causes of these variations and the relationship between the feedstock properties and the provenance data collected. Five feedstocks were studied: Miscanthus, willow short rotation coppice (SRC), poplar SRC, poplar grown as short rotation forests (SRF), and spruce SRF, with poplar and Sitka spruce selected to represent broadleaved and coniferous biomass crops respectively. Provenance data include site properties (such as general climate zone and soil chemistry), the conditions at the time of sample collection, and past management of the site and crop with soil samples also collected for analysis. The feedstock samples were analysed in UKAS accredited laboratories.

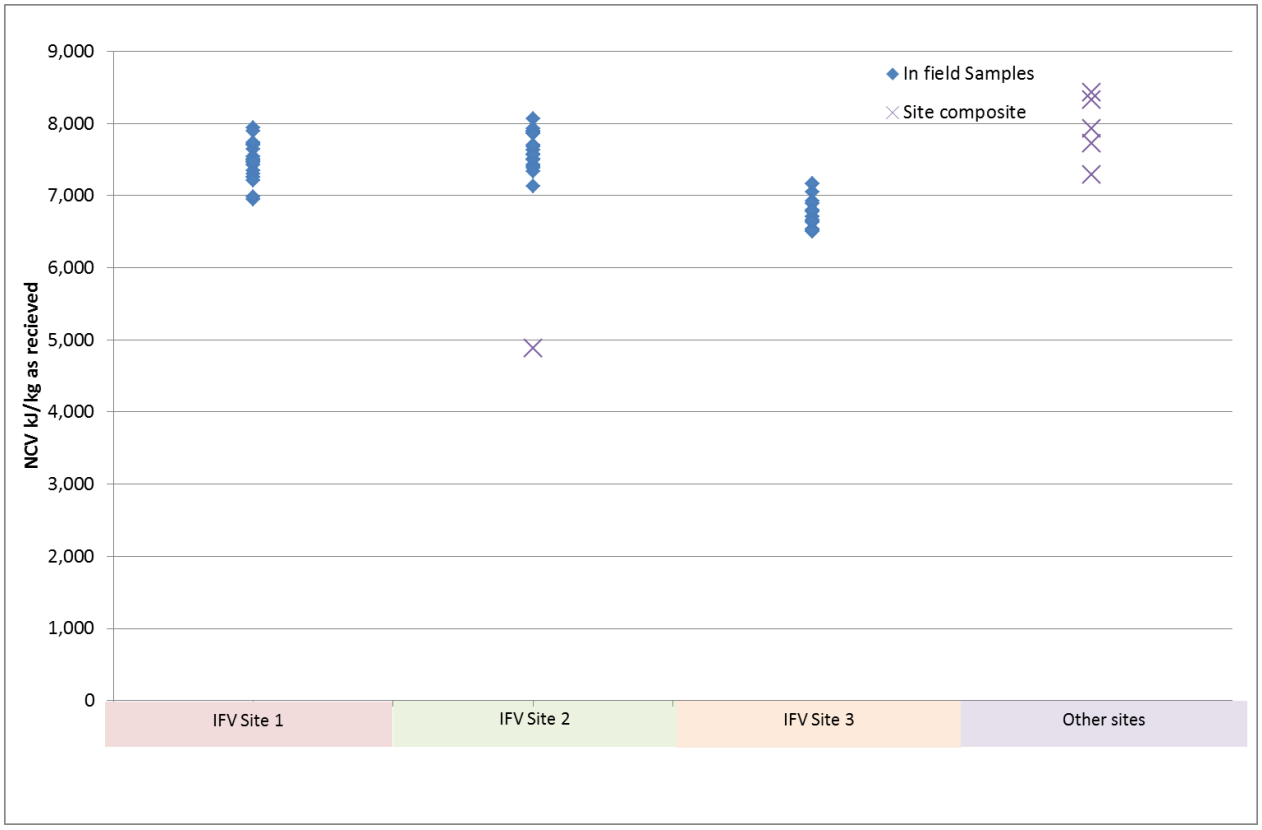
Context:

The Characterisation of Feedstocks project provides an understanding of UK produced 2nd generation energy biomass properties, how these vary and what causes this variability. In this project, several types of UK-grown biomass, produced under varying conditions, were sampled. The biomass sampled included Miscanthus, Short Rotation Forestry (SRF) and Short Rotation Coppice (SRC) Willow. The samples were tested to an agreed schedule in an accredited laboratory. The results were analysed against the planting, growing, harvesting and storage conditions (i.e. the provenance) to understand what impacts different production and storage methods have on the biomass properties. The main outcome of this project is a better understanding of the key characteristics of UK biomass feedstocks (focusing on second generation) relevant in downstream energy conversion applications, and how these characteristics vary by provenance.

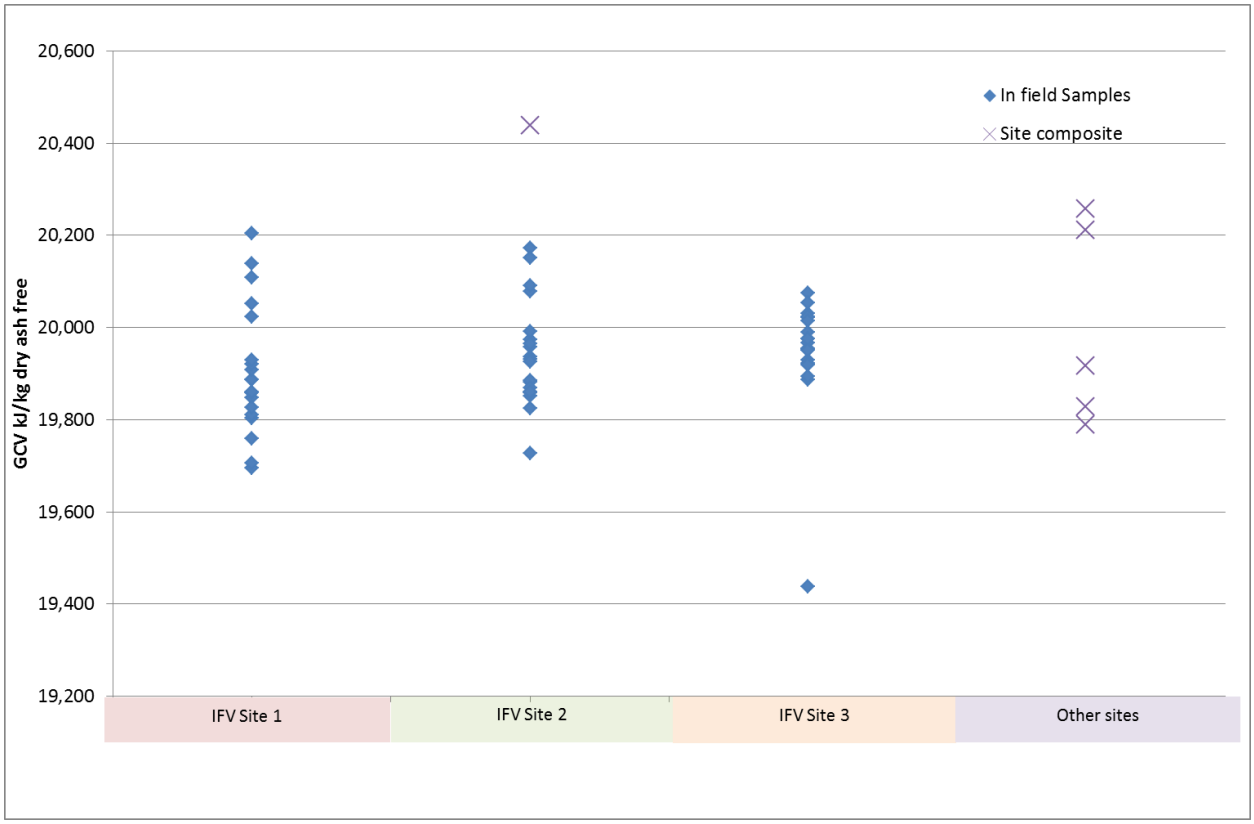
Appendix 10 Part 3: Graphs for Willow SRC IFV study

Moisture Content of Willow IFV

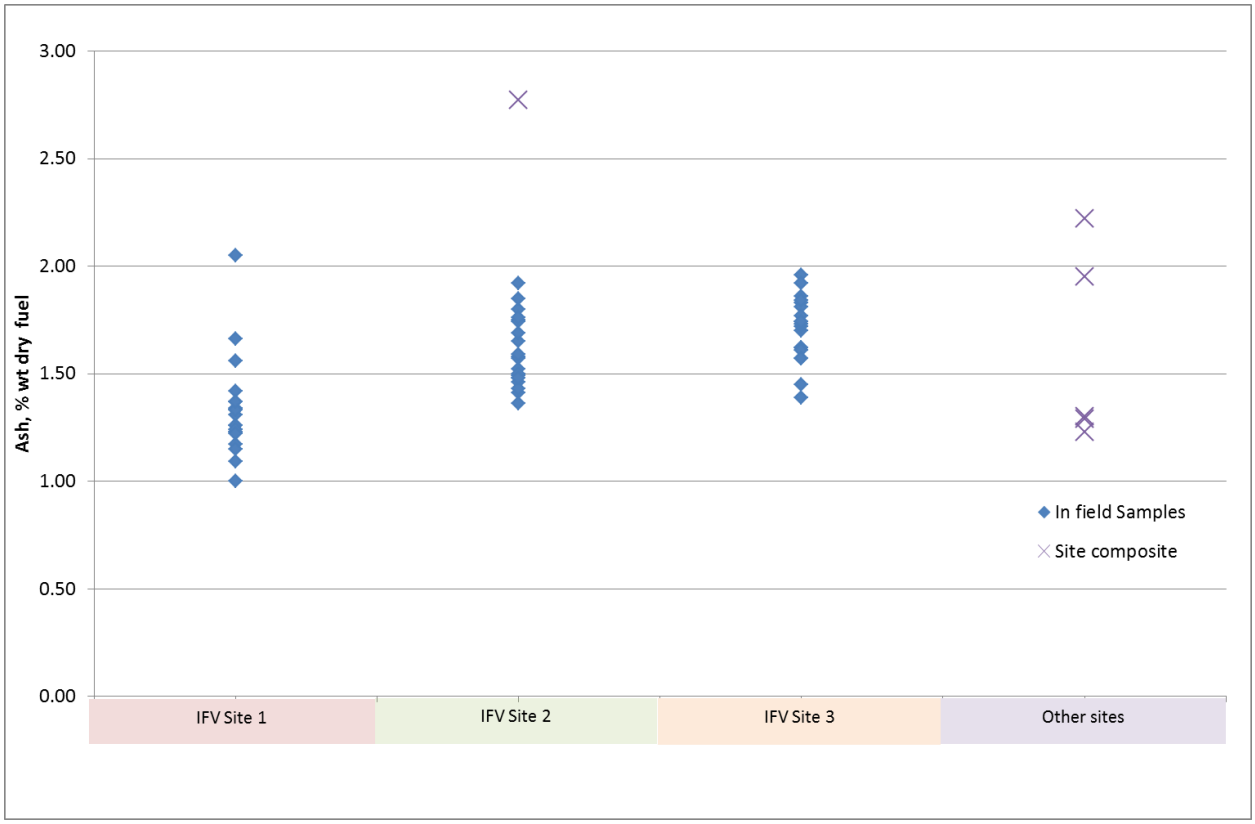
Net Calorific Value of Willow IFV



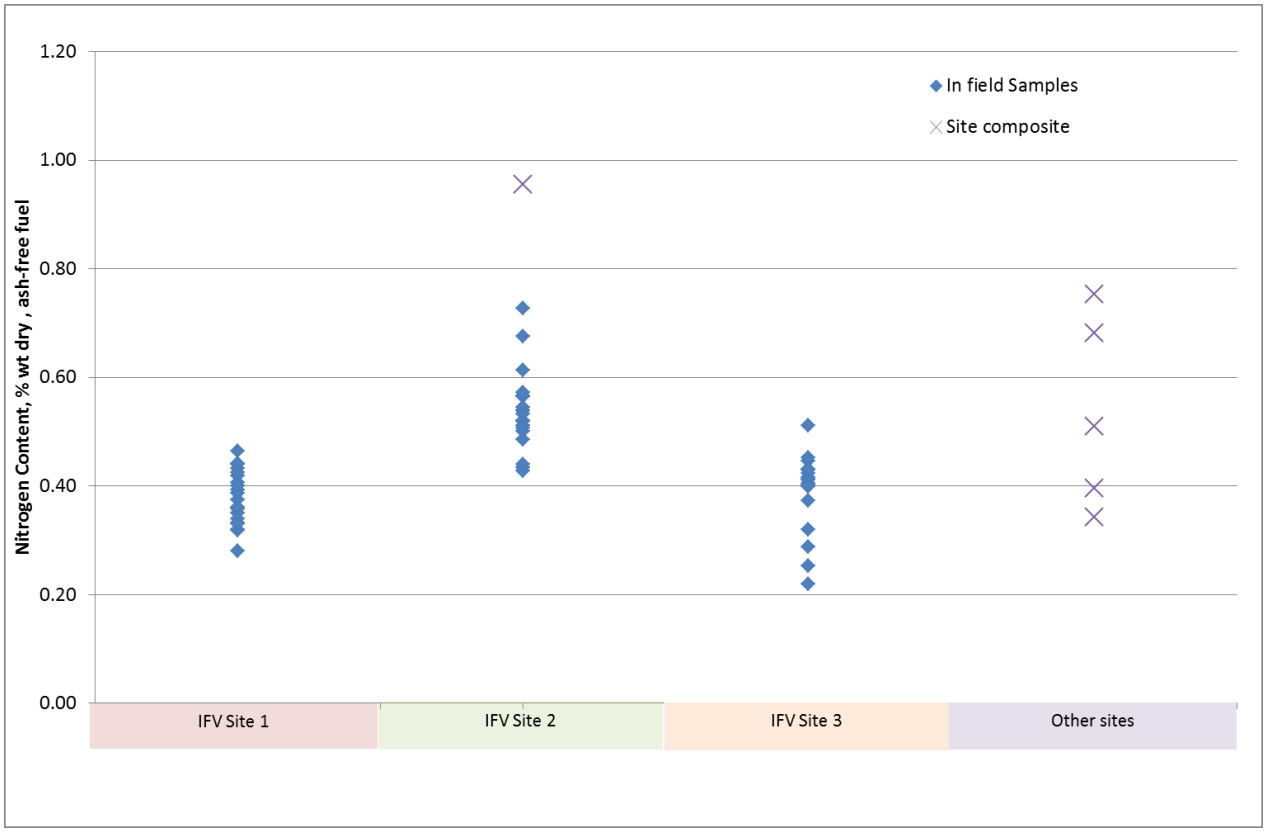
Gross Calorific Value (DAF) of Willow IFV



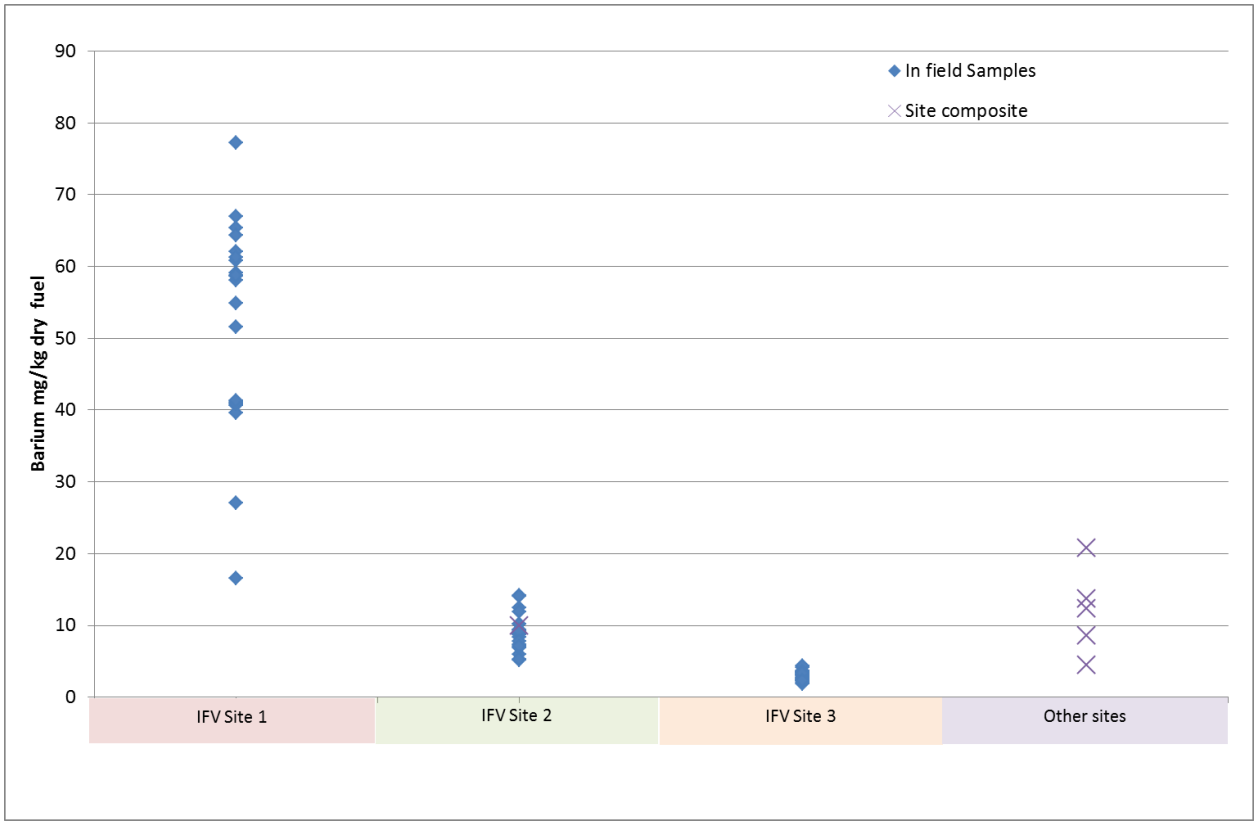
Dry Ash content of Willow IFV



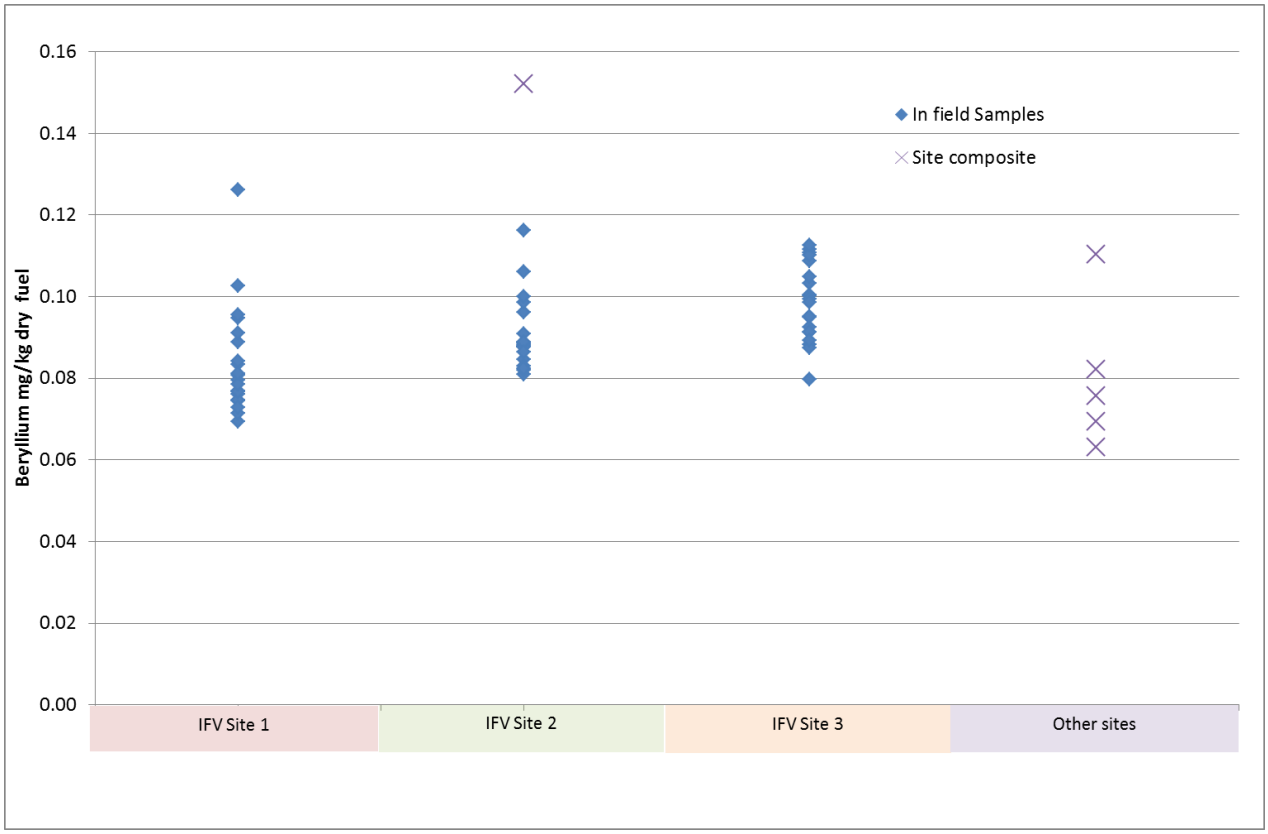
Dry nitrogen content of Willow IFV



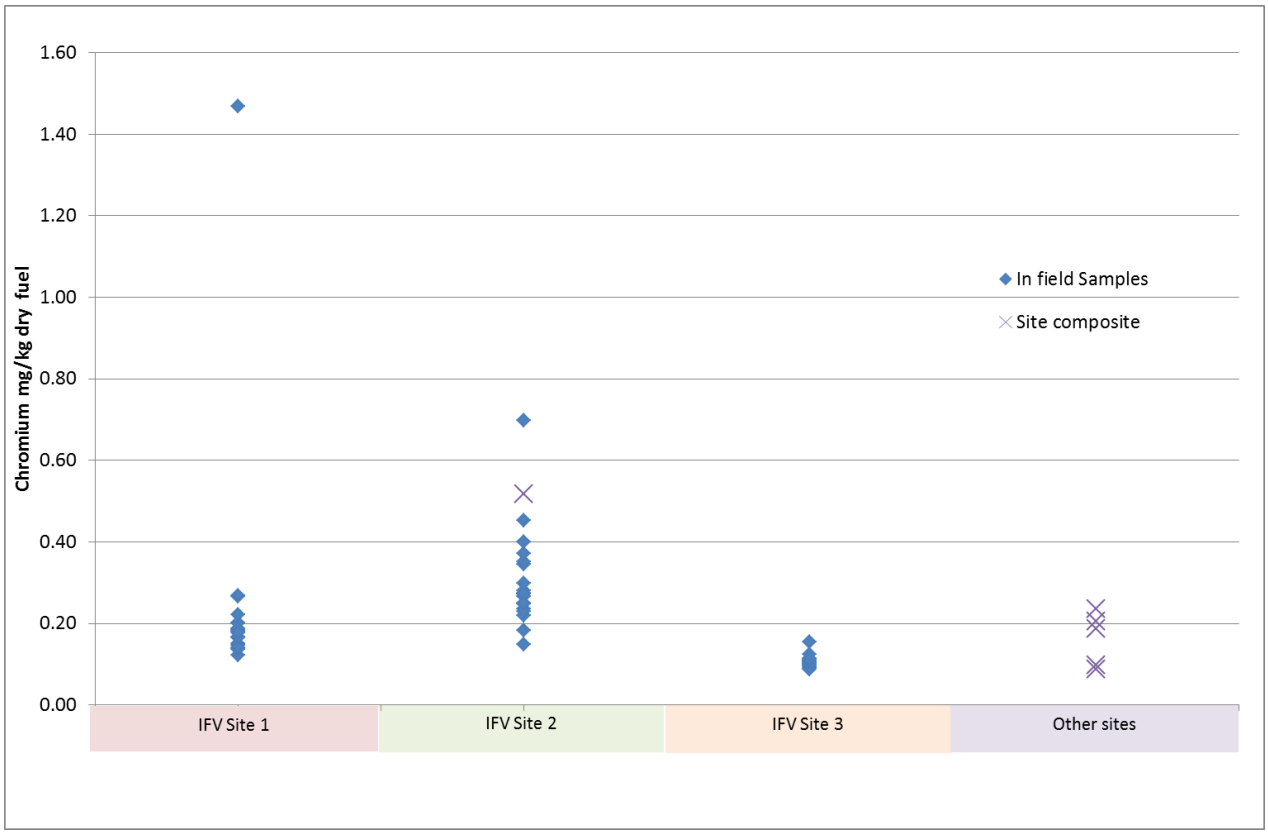
Barium content of Willow IFV



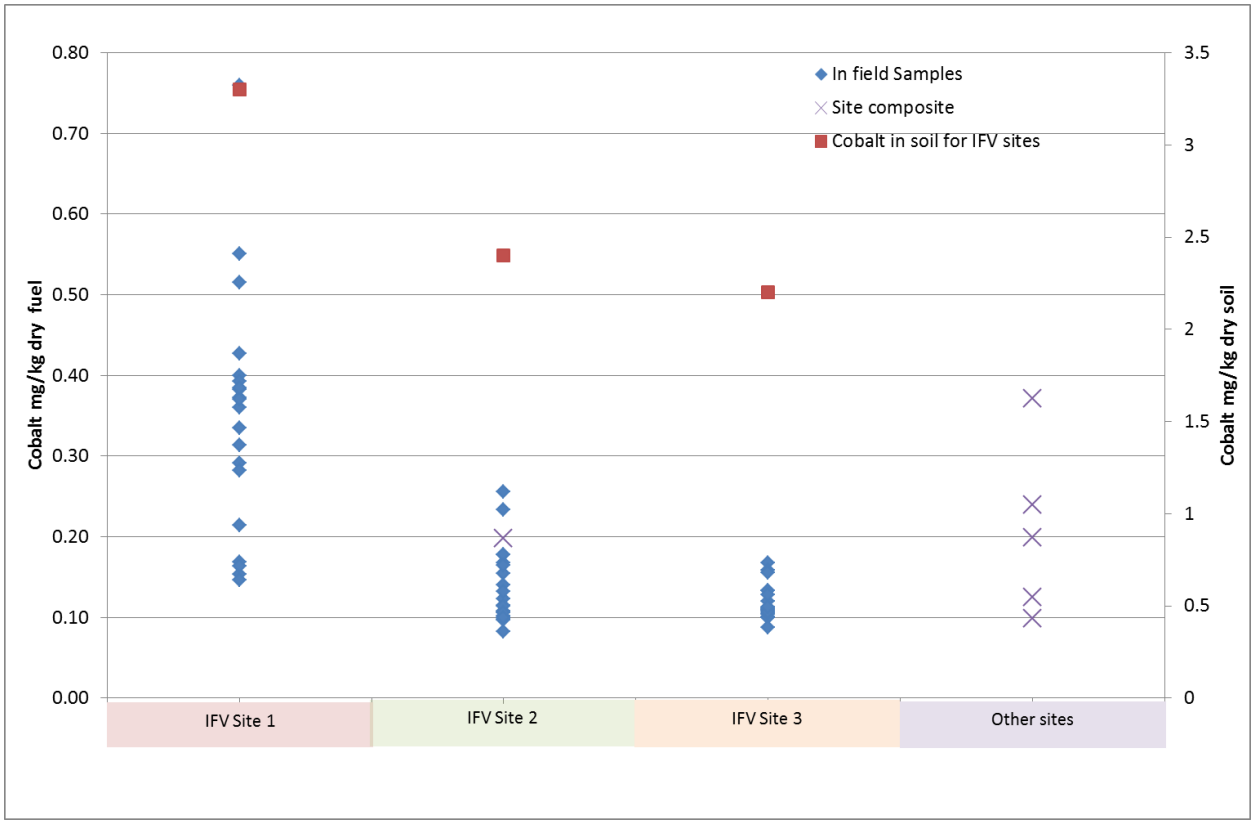
Beryllium content of Willow IFV



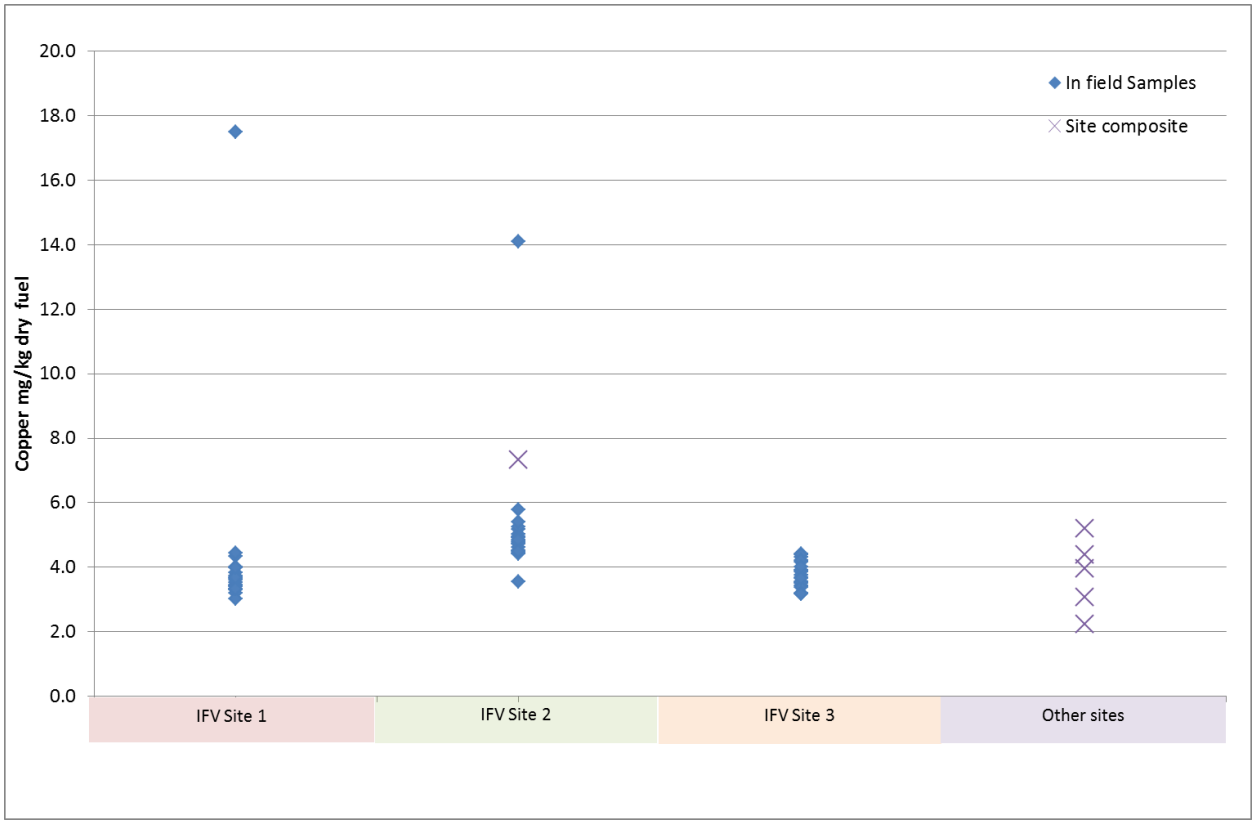
Chromium content of Willow IFV



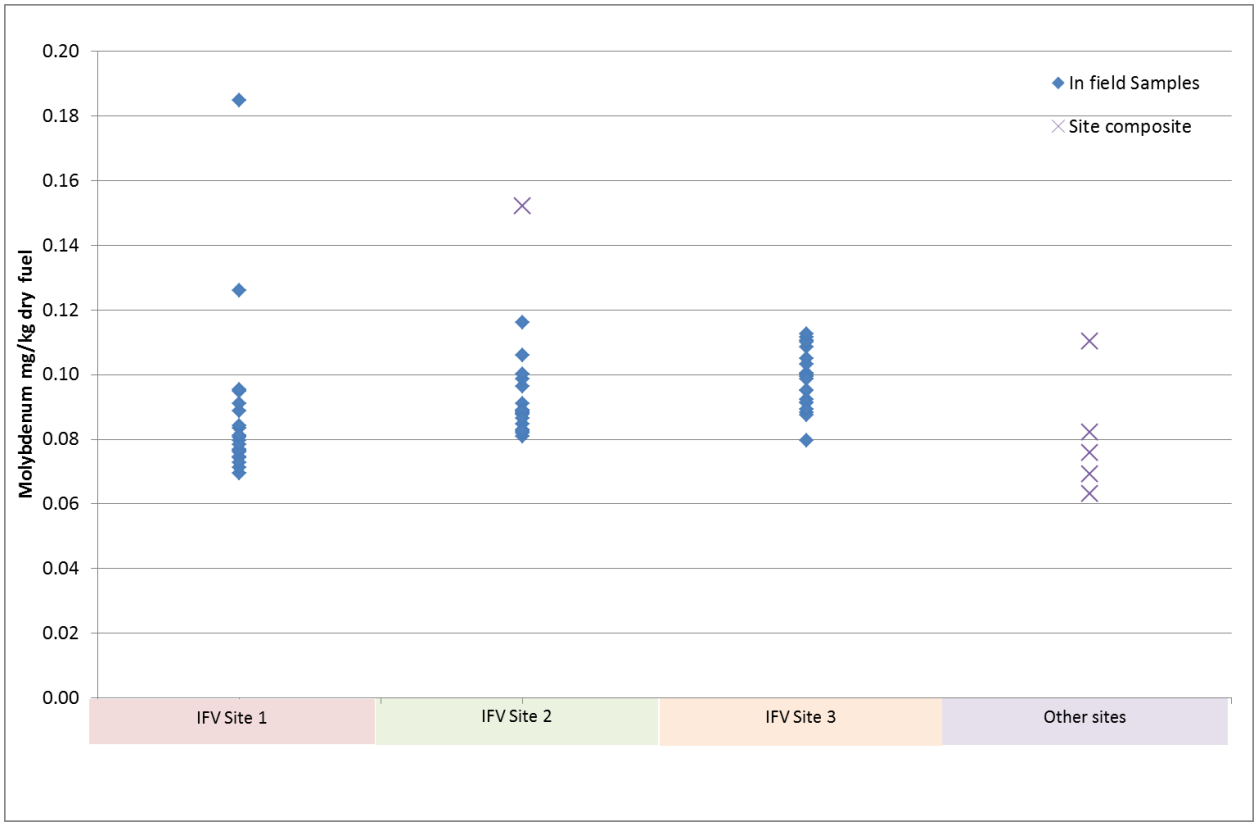
Cobalt content of Willow IFV



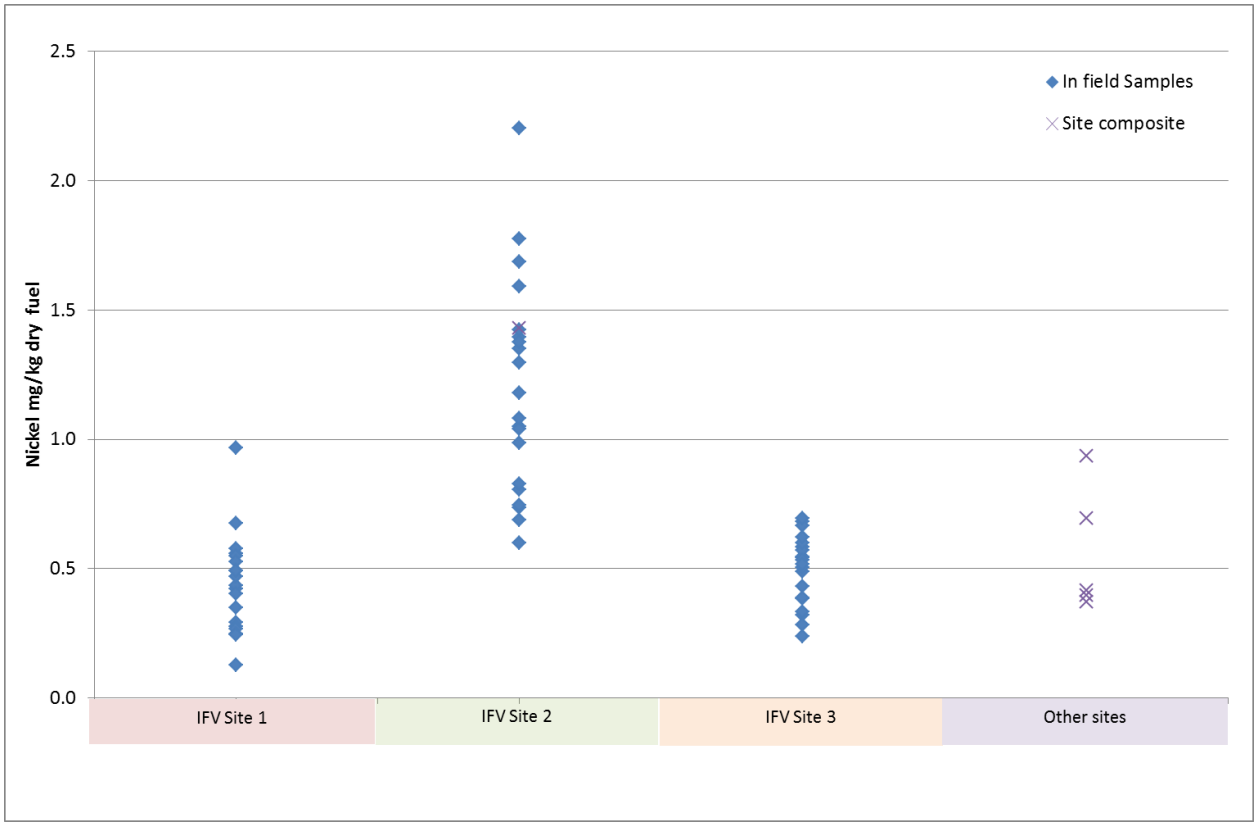
Copper content of Willow IFV



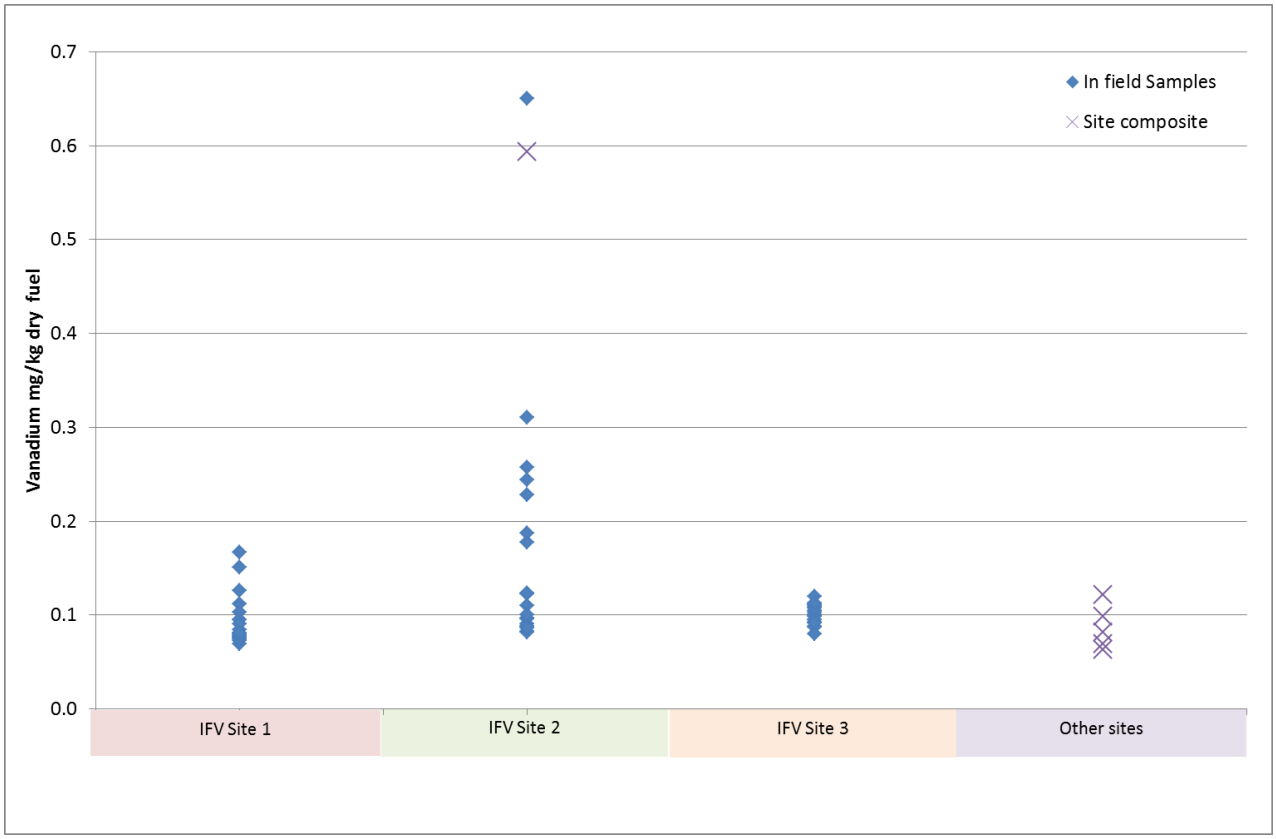
Molybdenum content of Willow IFV



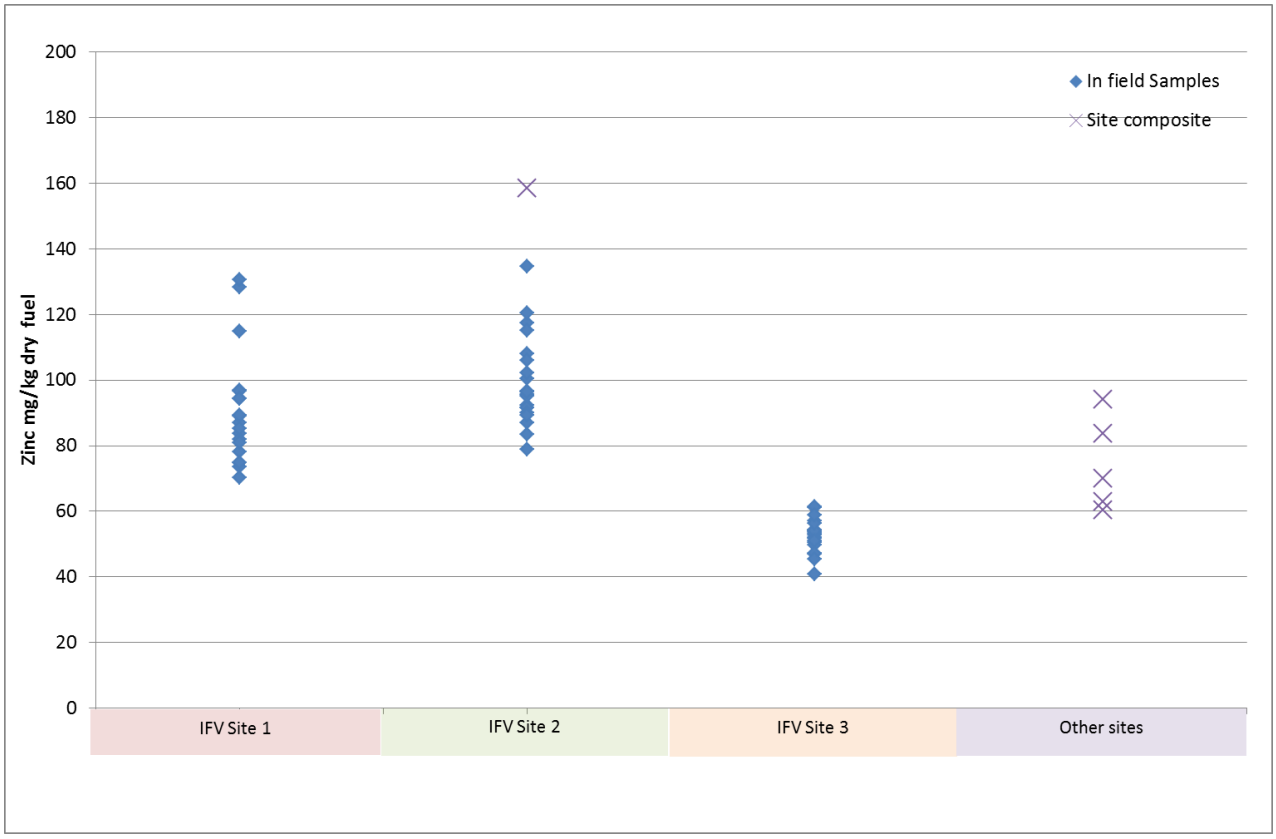
Nickel content of Willow IFV



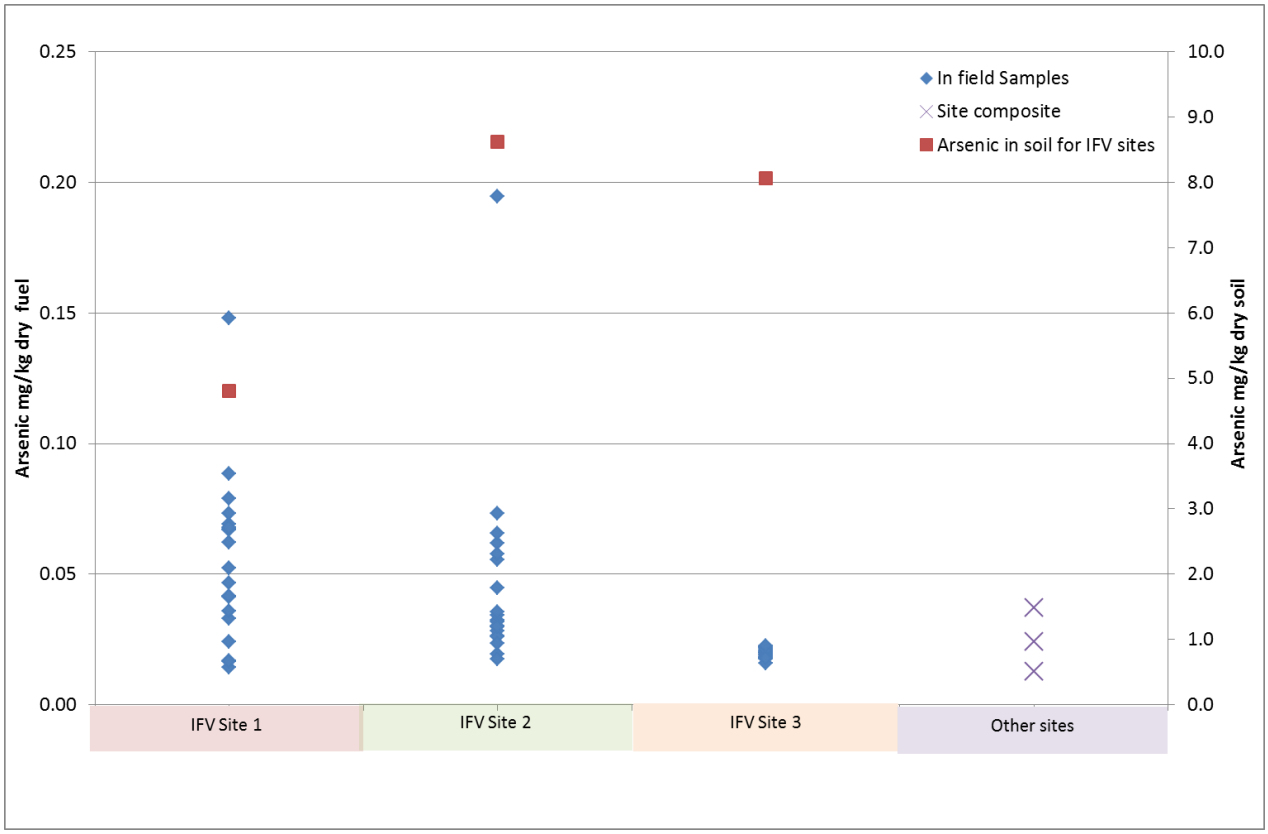
Vanadium content of Willow IFV



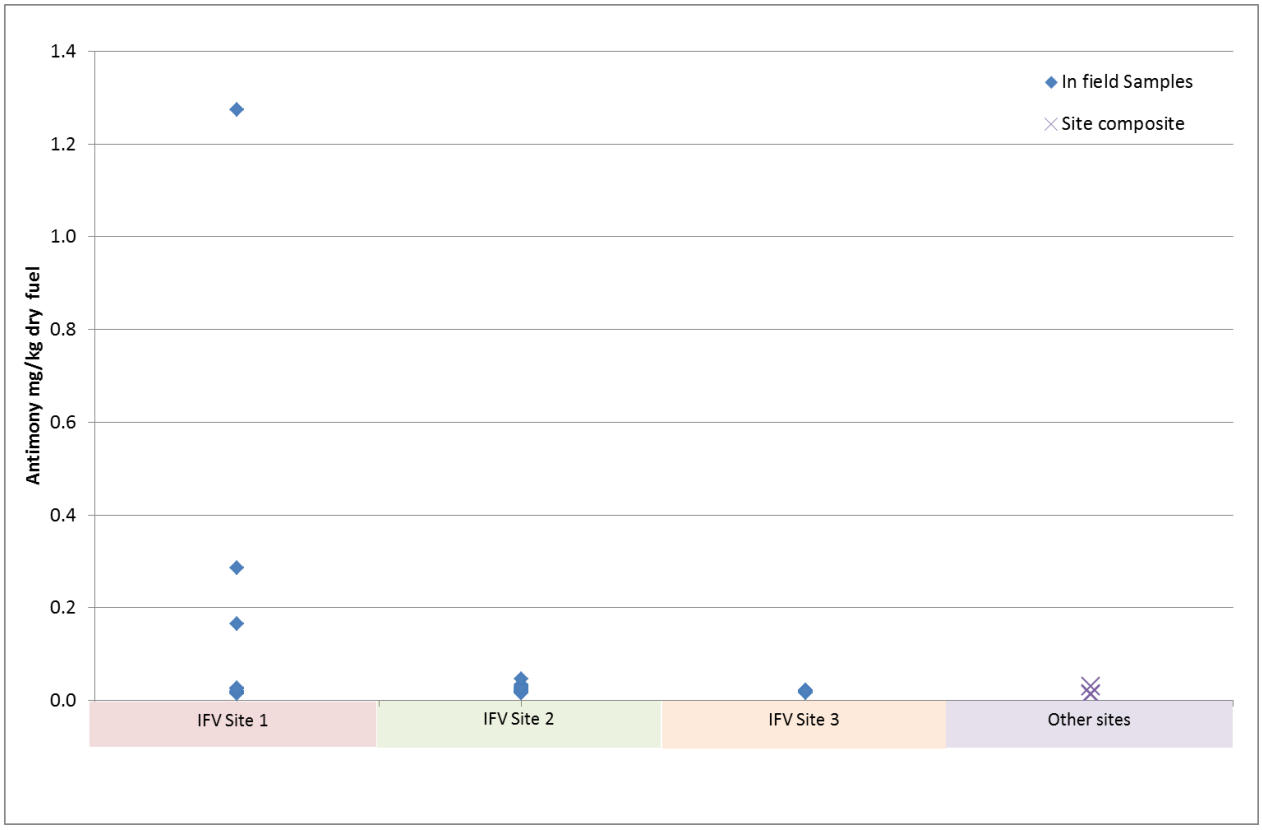
Zinc content of Willow IFV



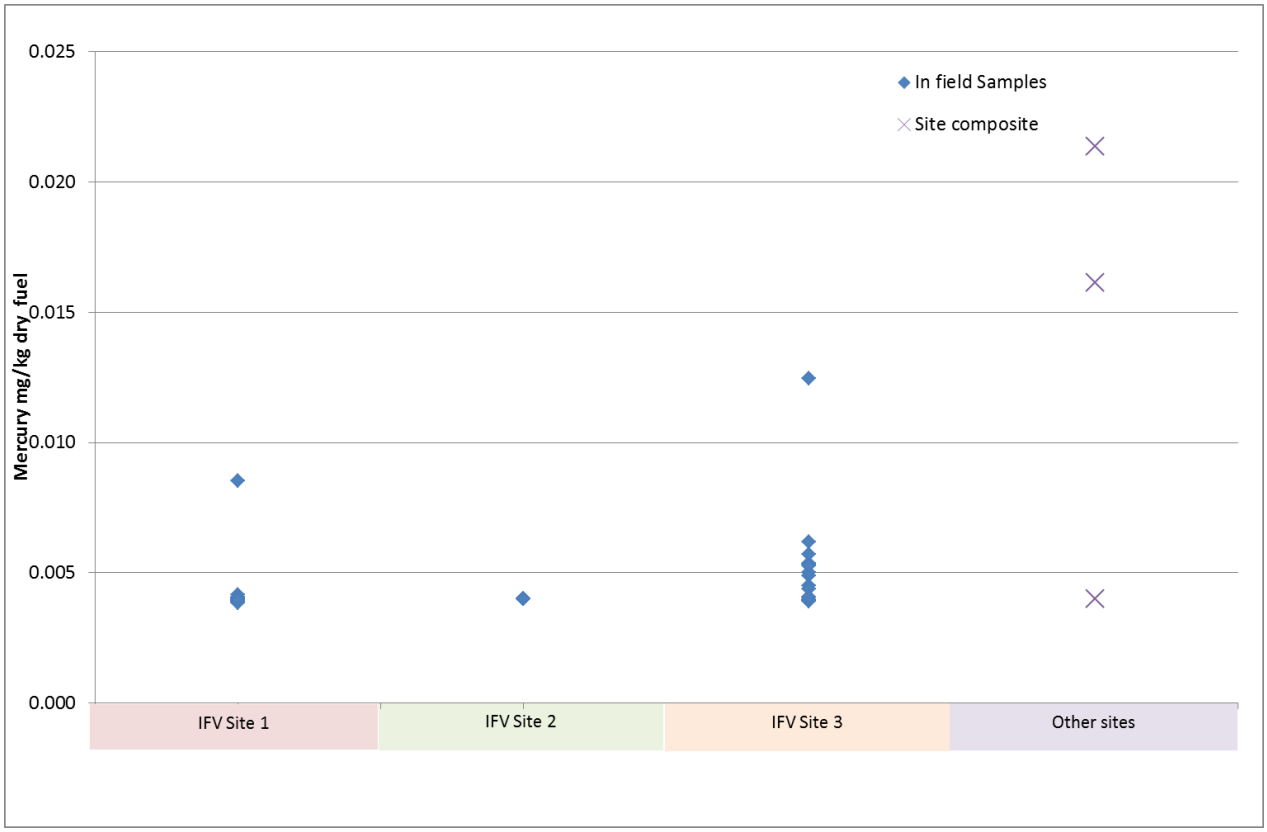
Arsenic content of Willow IFV



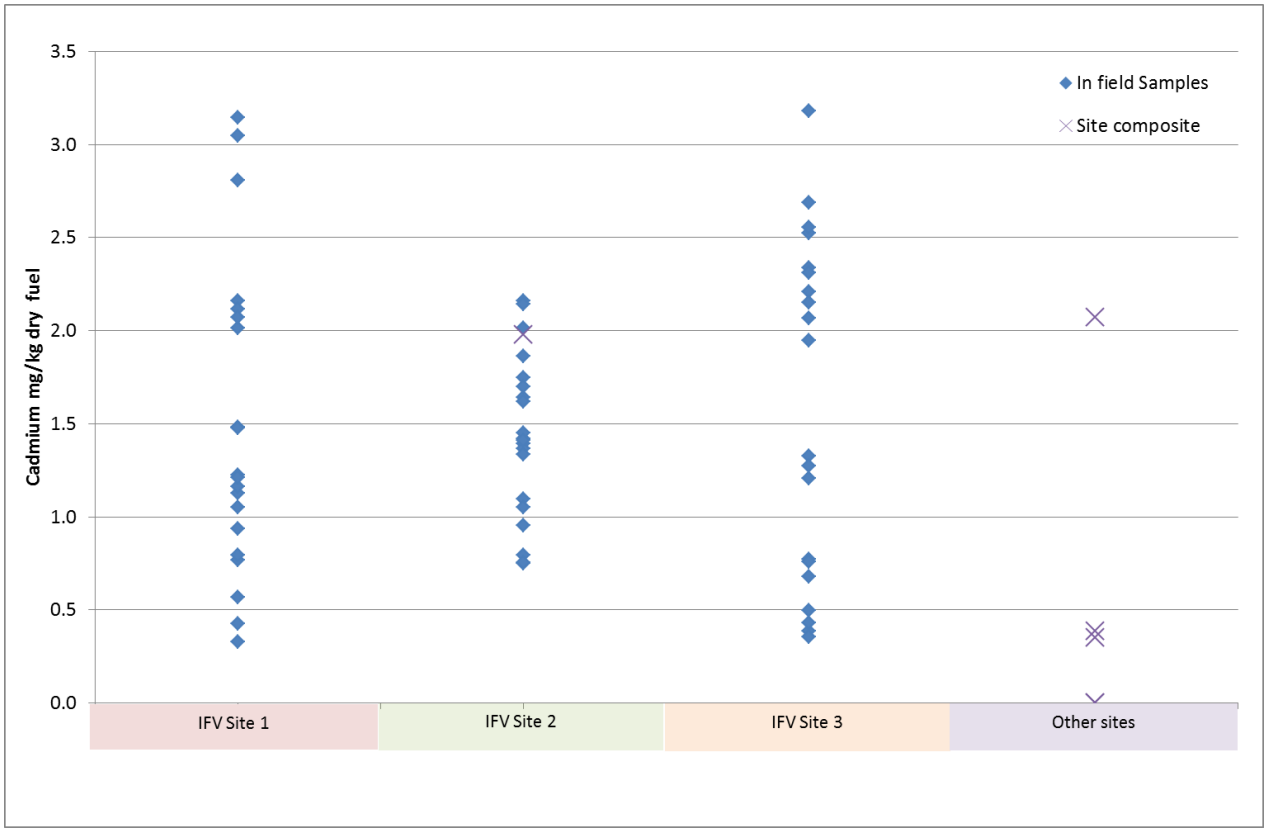
Antimony content of Willow IFV



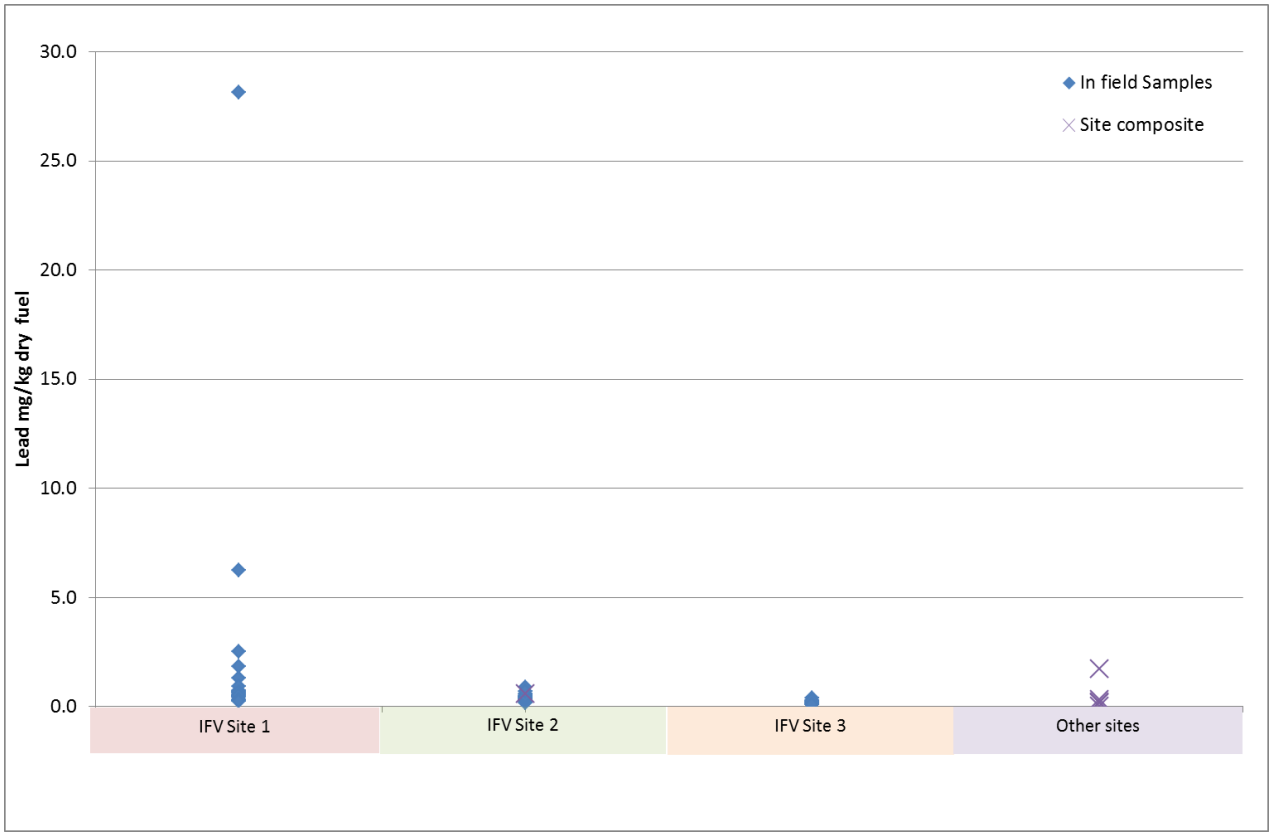
Mercury content of Willow IFV



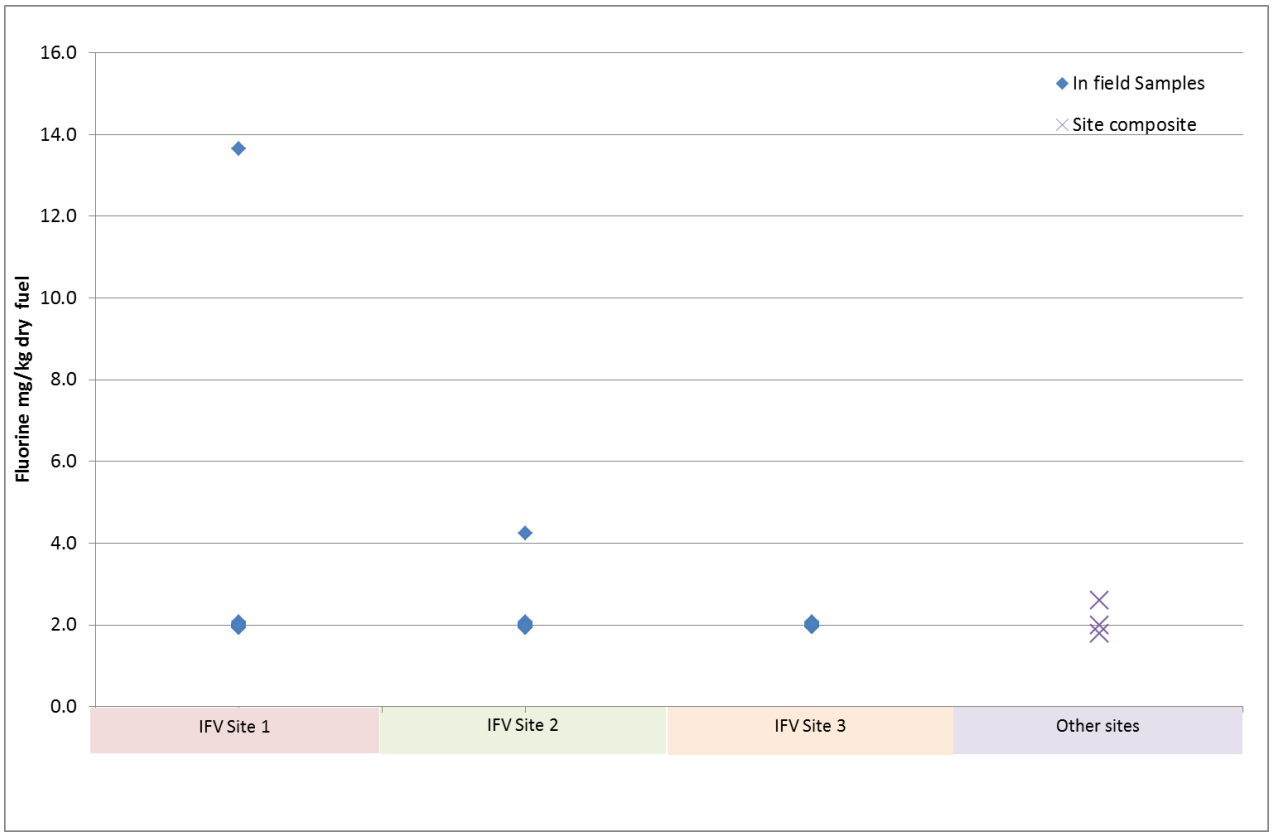
Cadmium content of Willow IFV



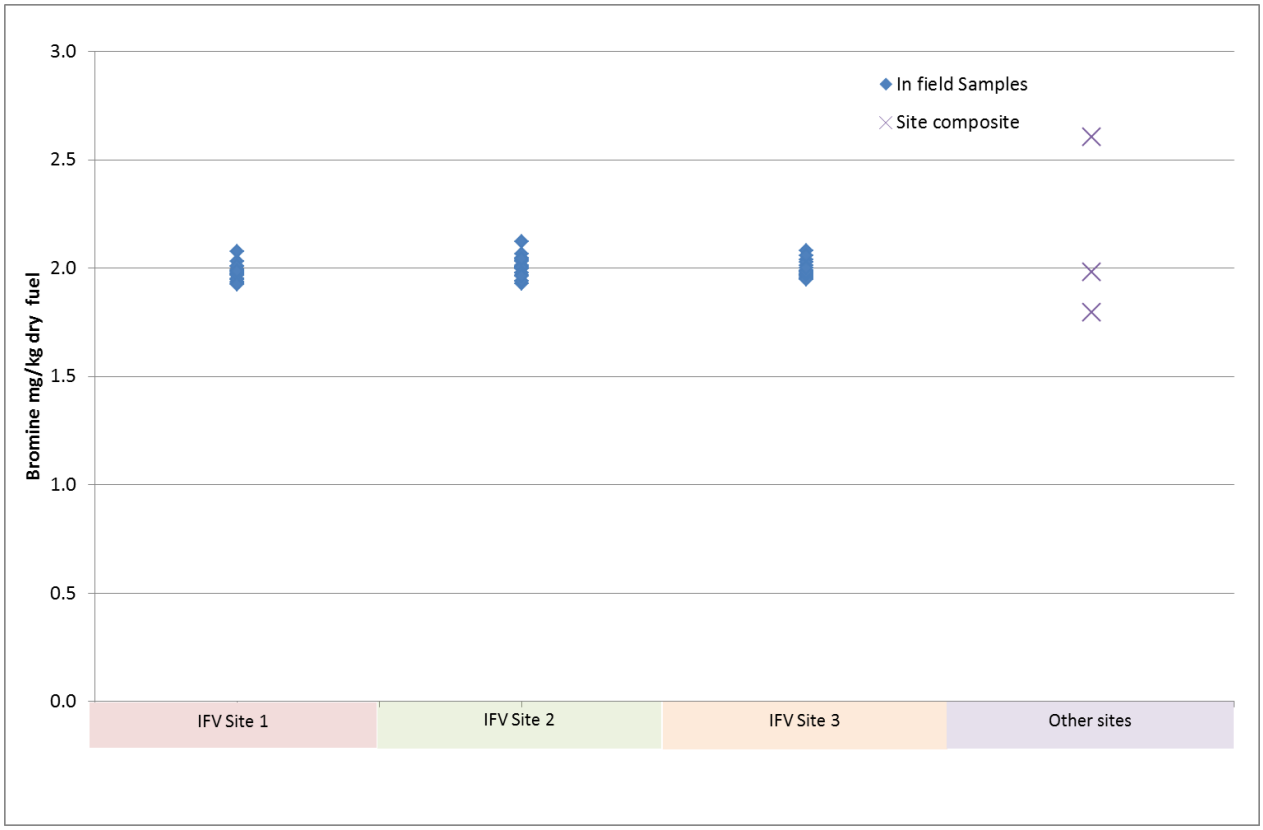
Lead content of Willow IFV



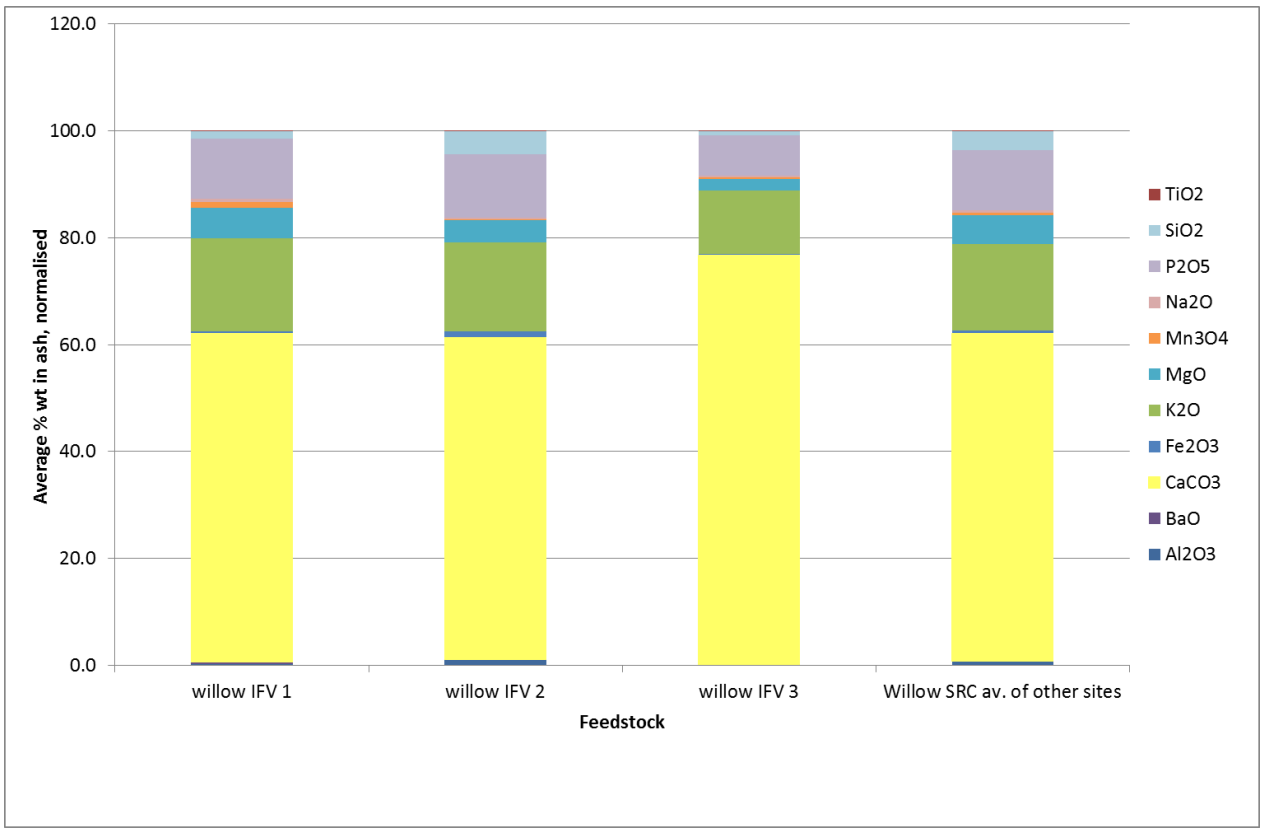
Fluorine content of Willow IFV



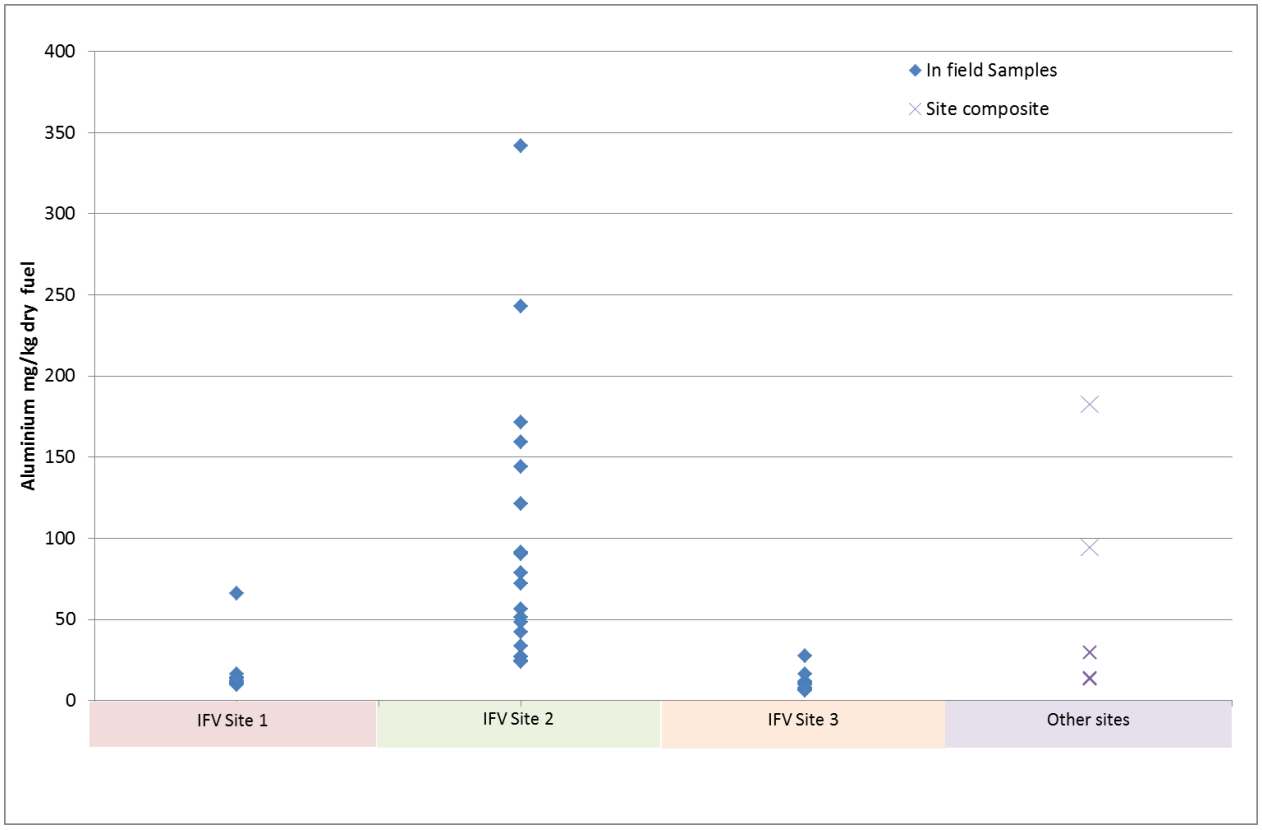
Bromine content of Willow IFV



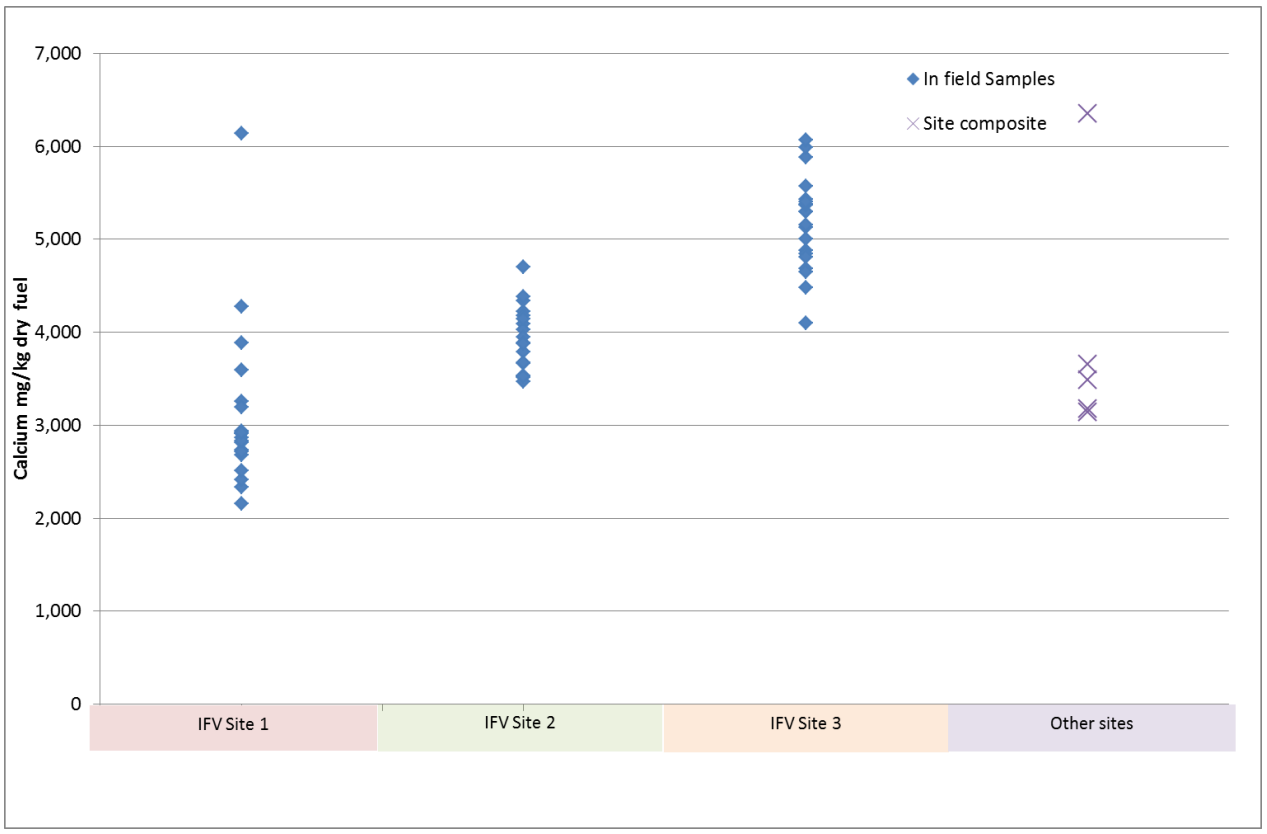
Variation in ash composition of Willow IFV



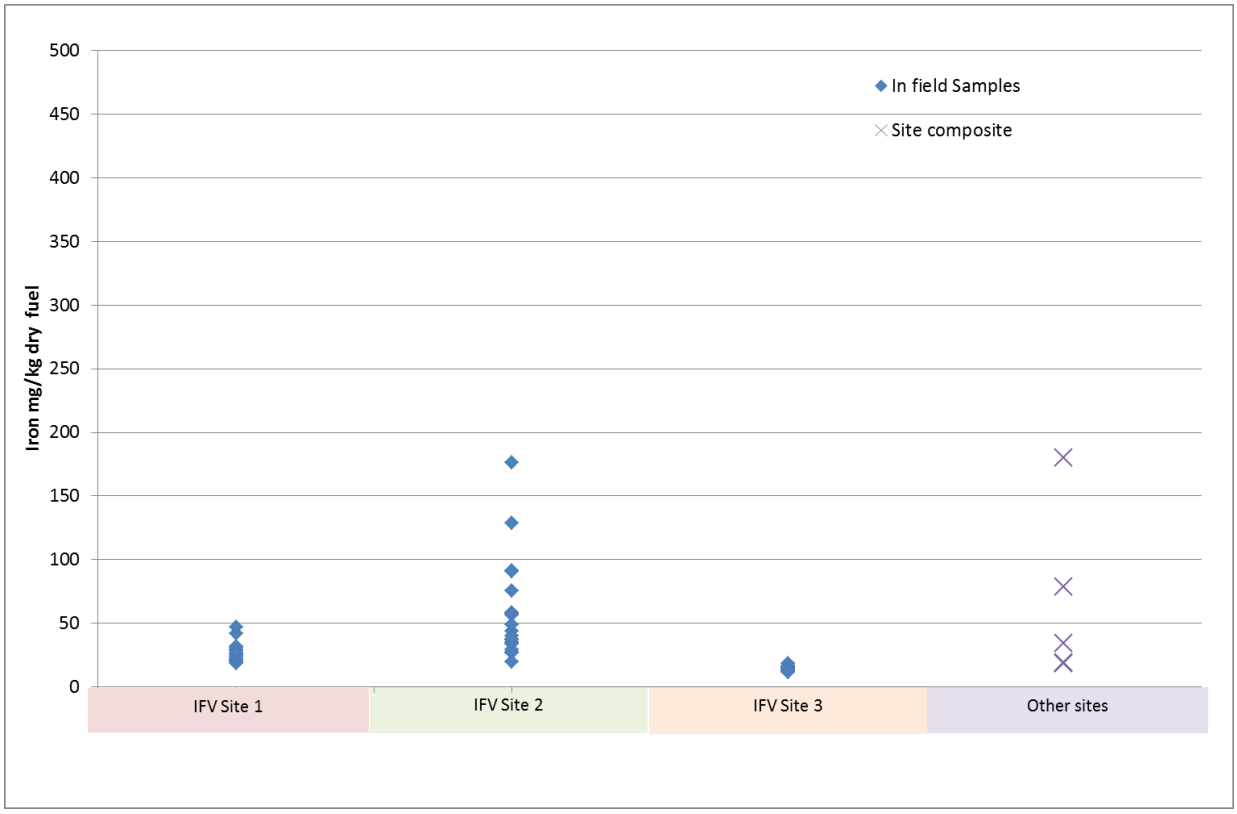
Aluminium content of Willow IFV



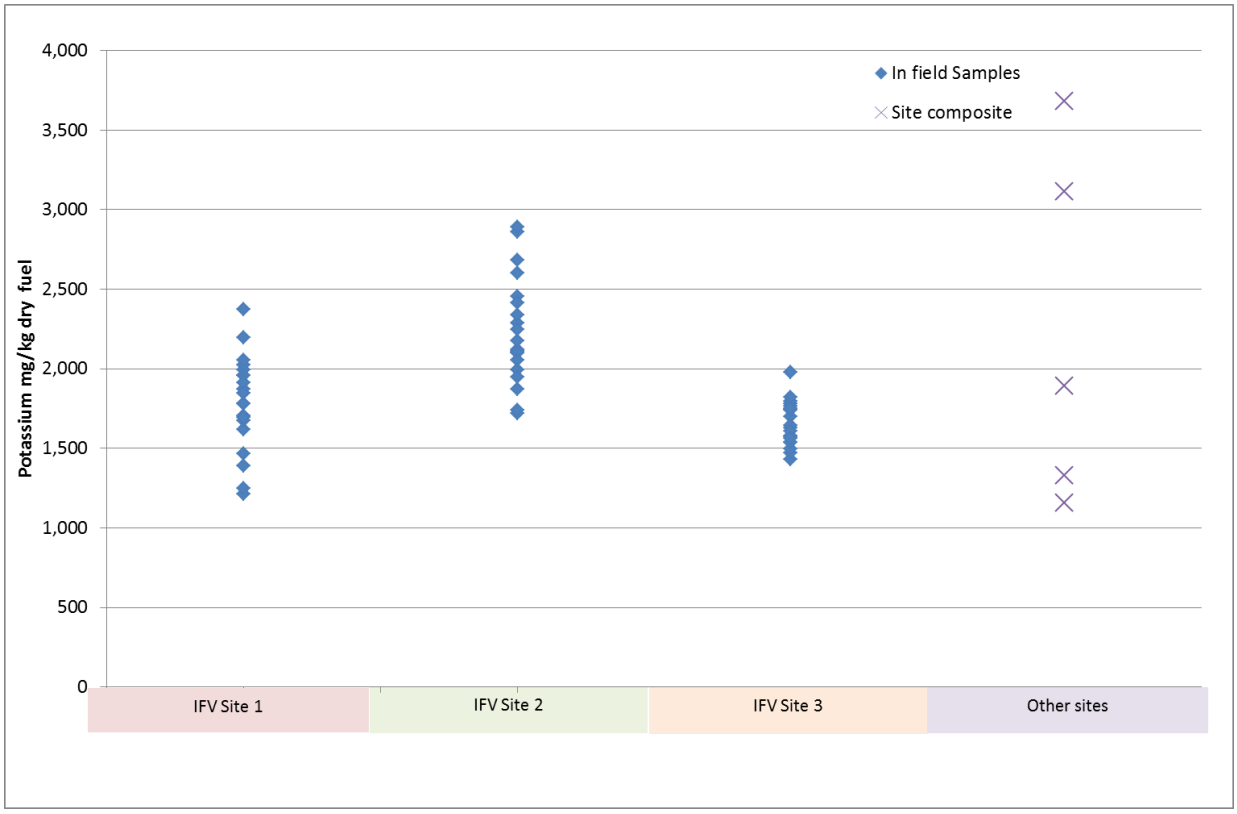
Calcium content of Willow IFV



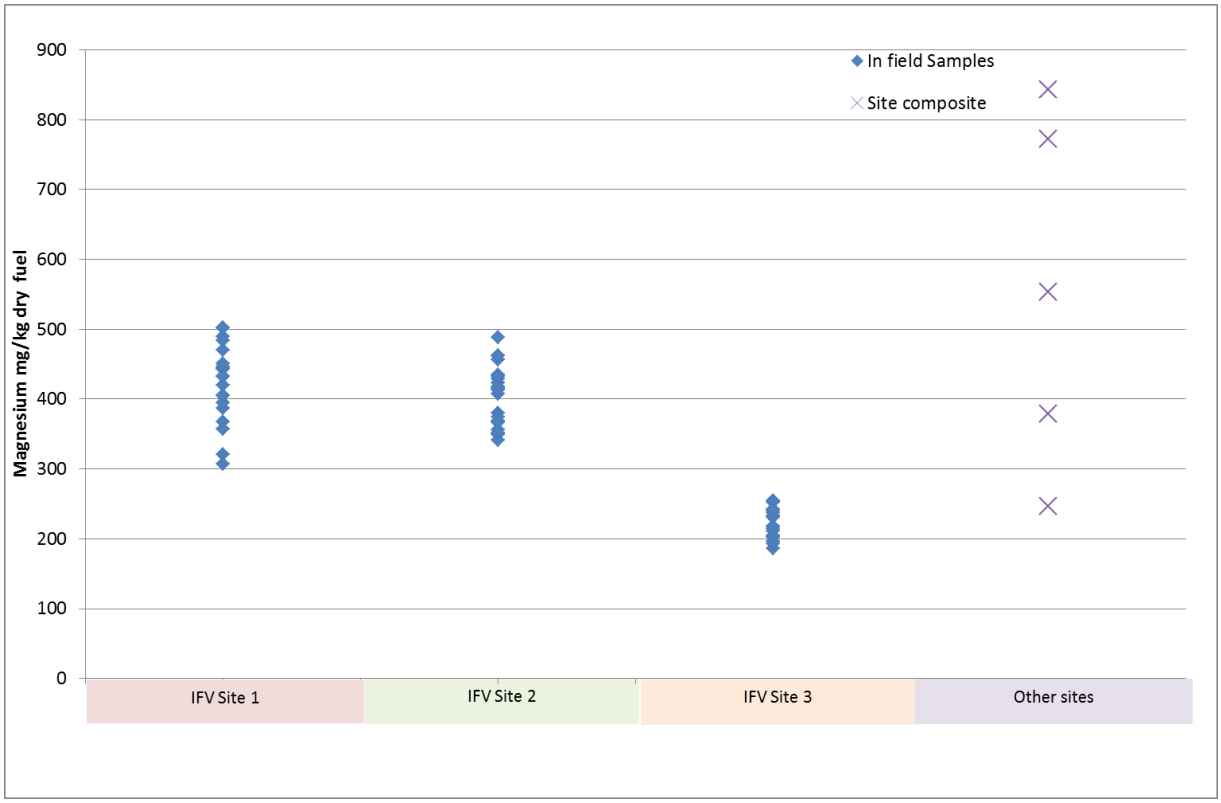
Iron content of Willow IFV



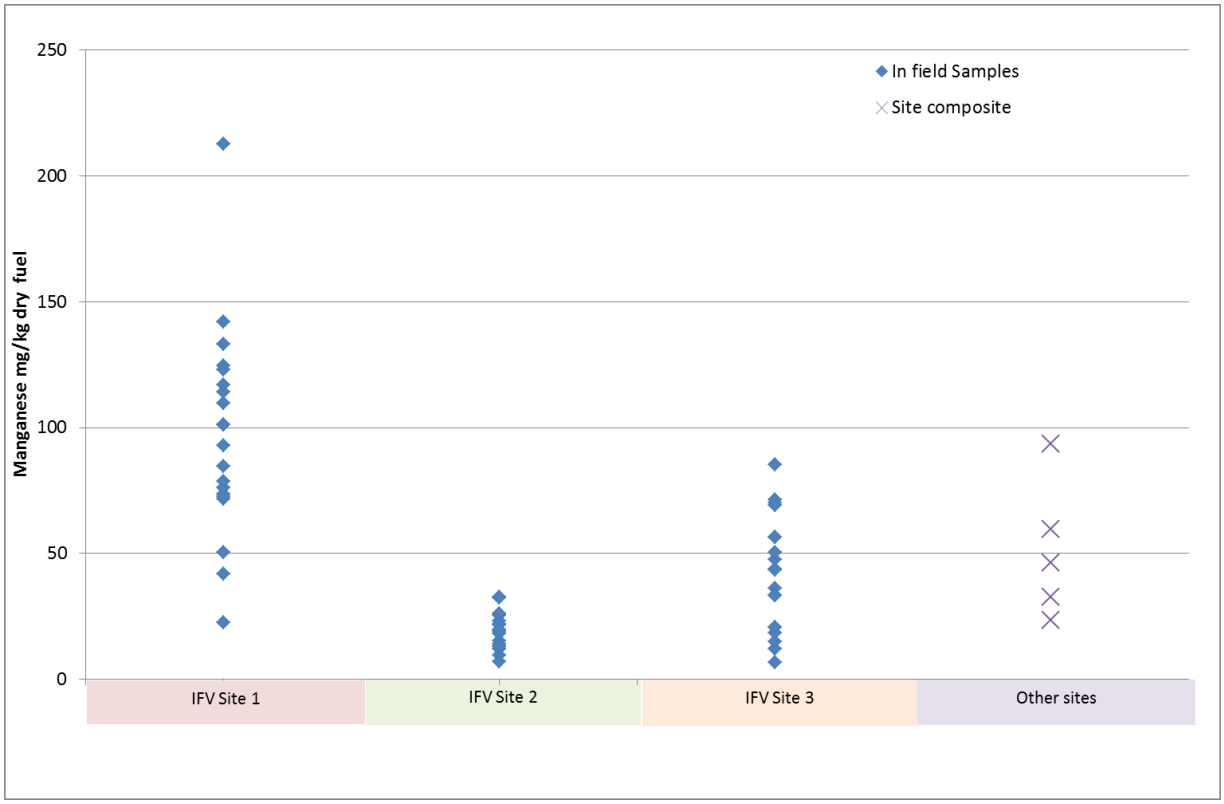
Potassium content of Willow IFV



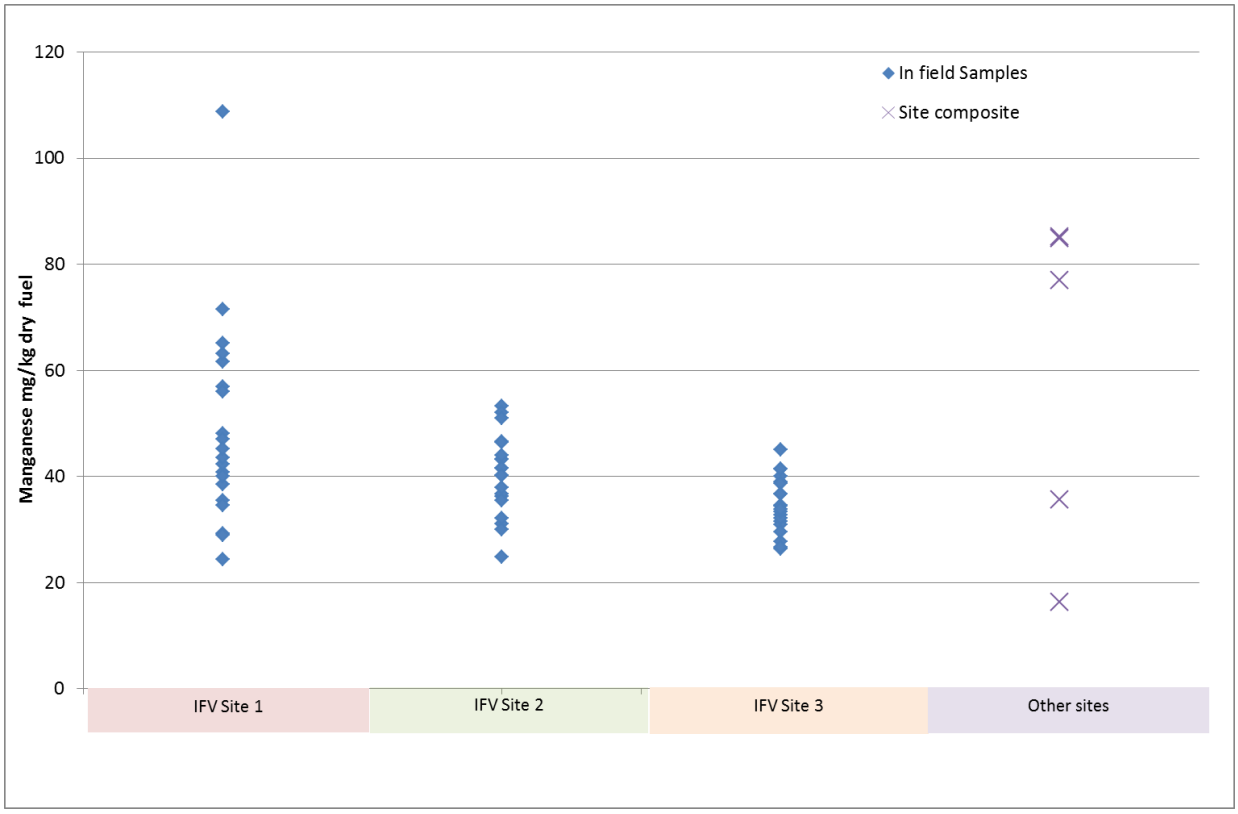
Magnesium content of Willow IFV



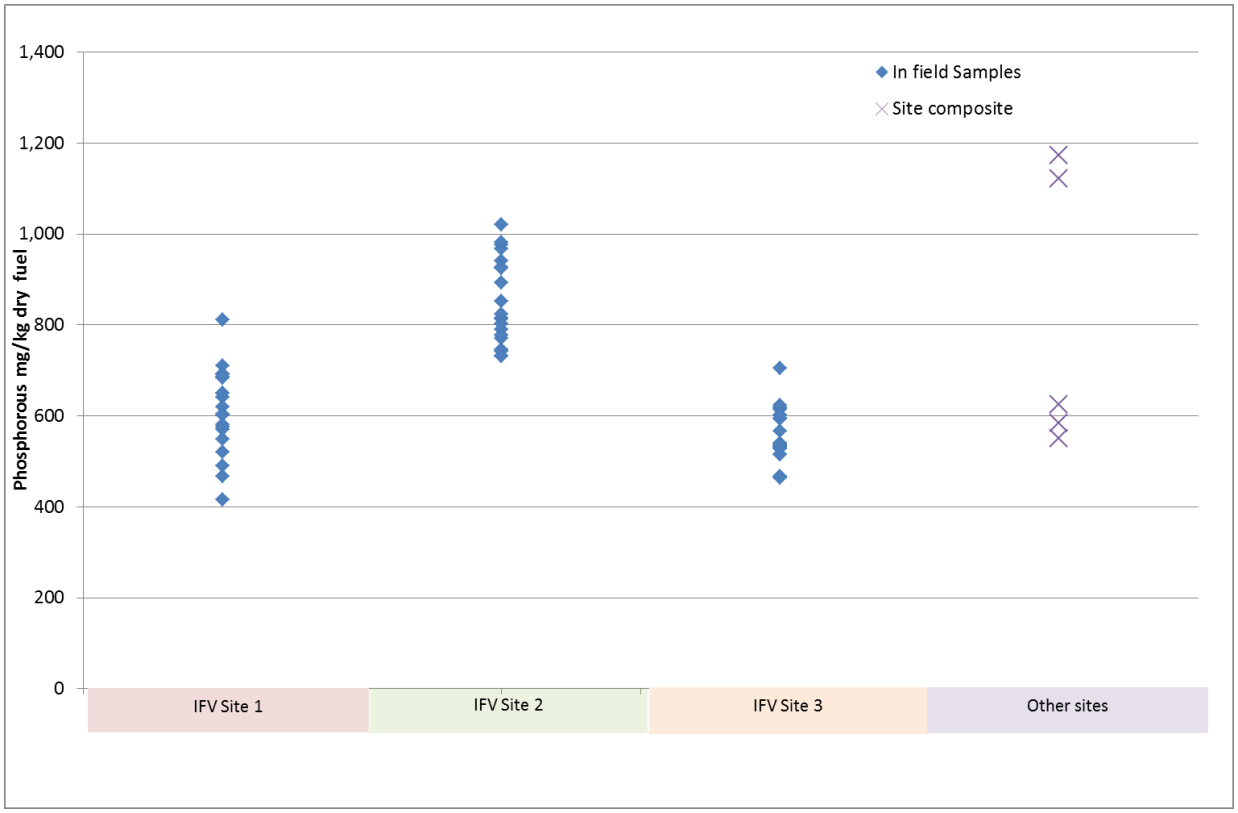
Manganese content of Willow IFV



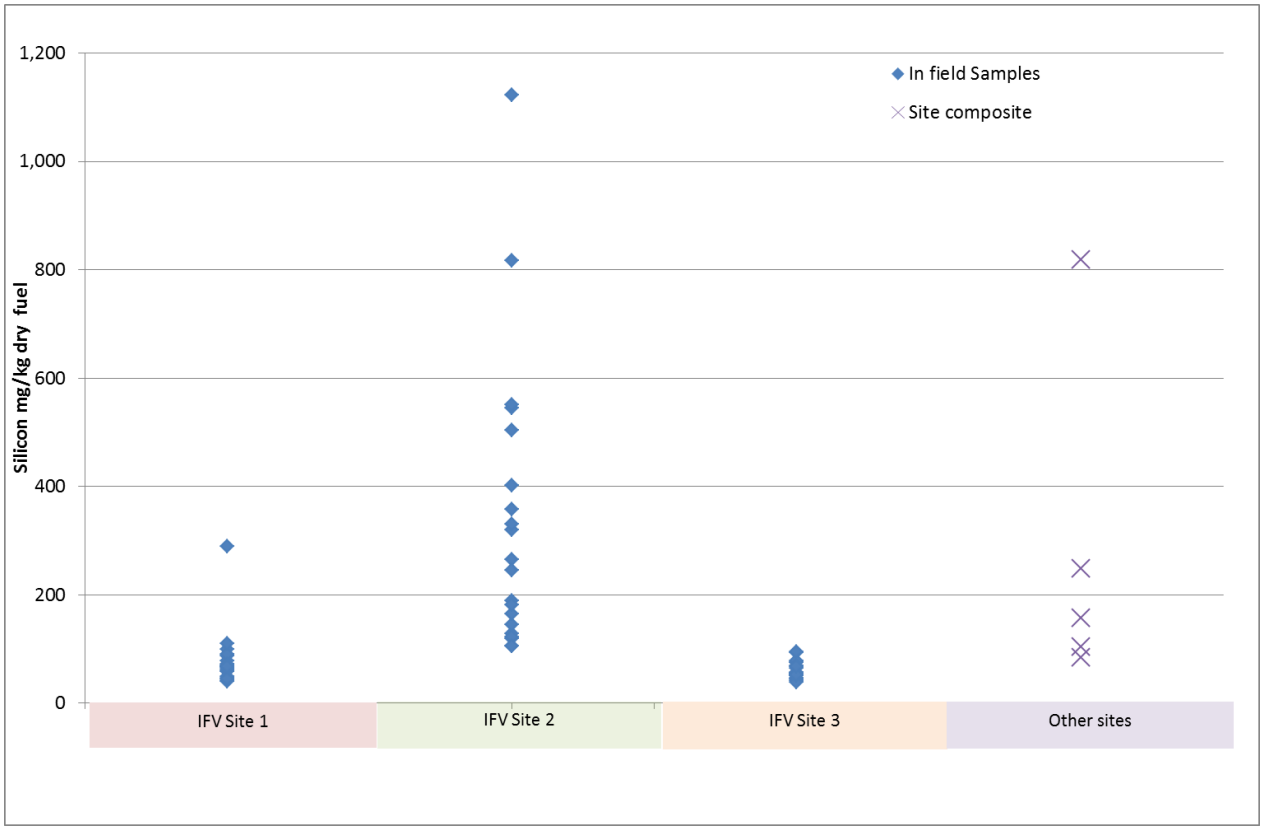
Sodium content of Willow IFV



Phosphorous content of Willow IFV



Silicon content of Willow IFV



Titanium content of Willow IFV