

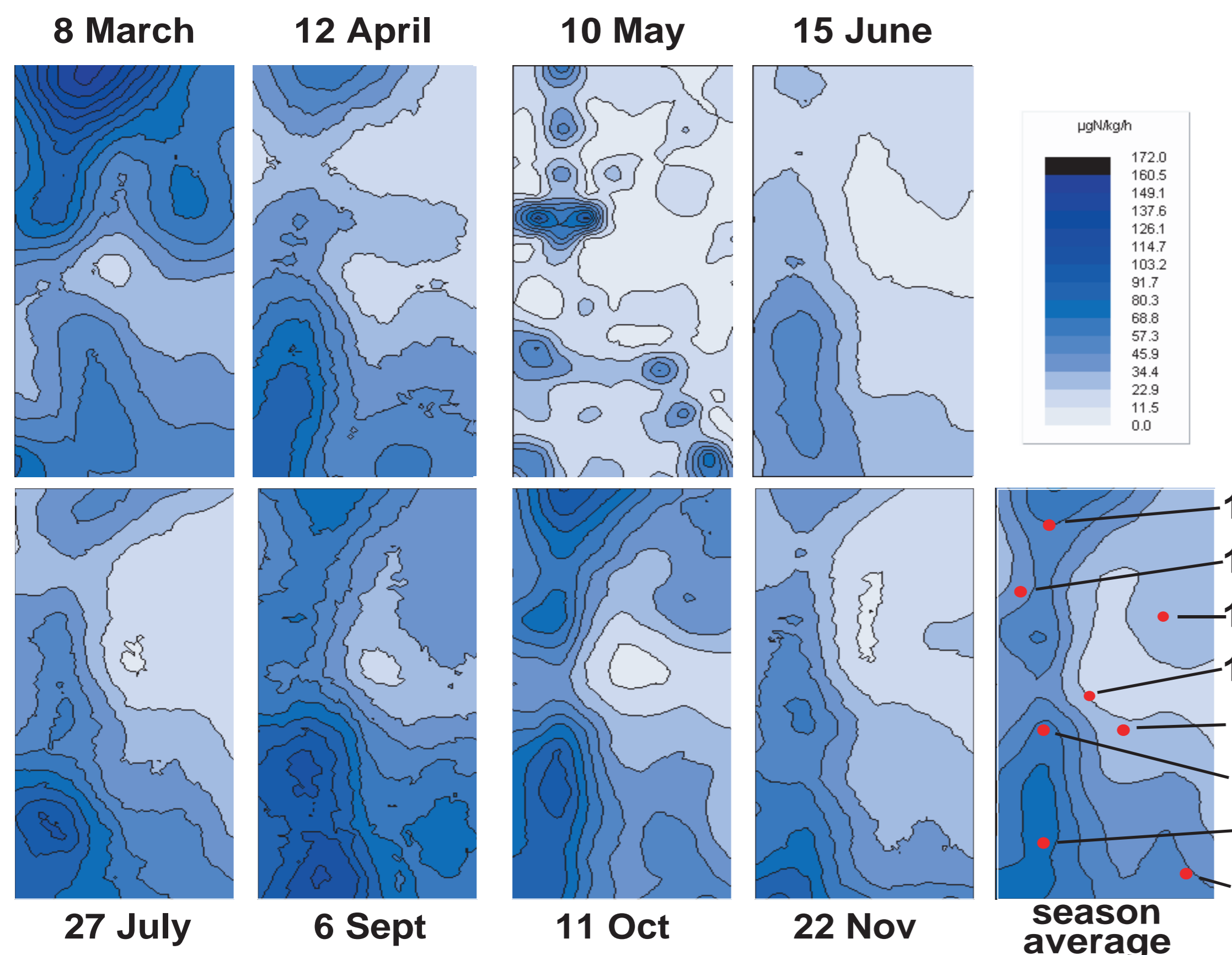
Nitrifiers in Space and Time

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Introduction

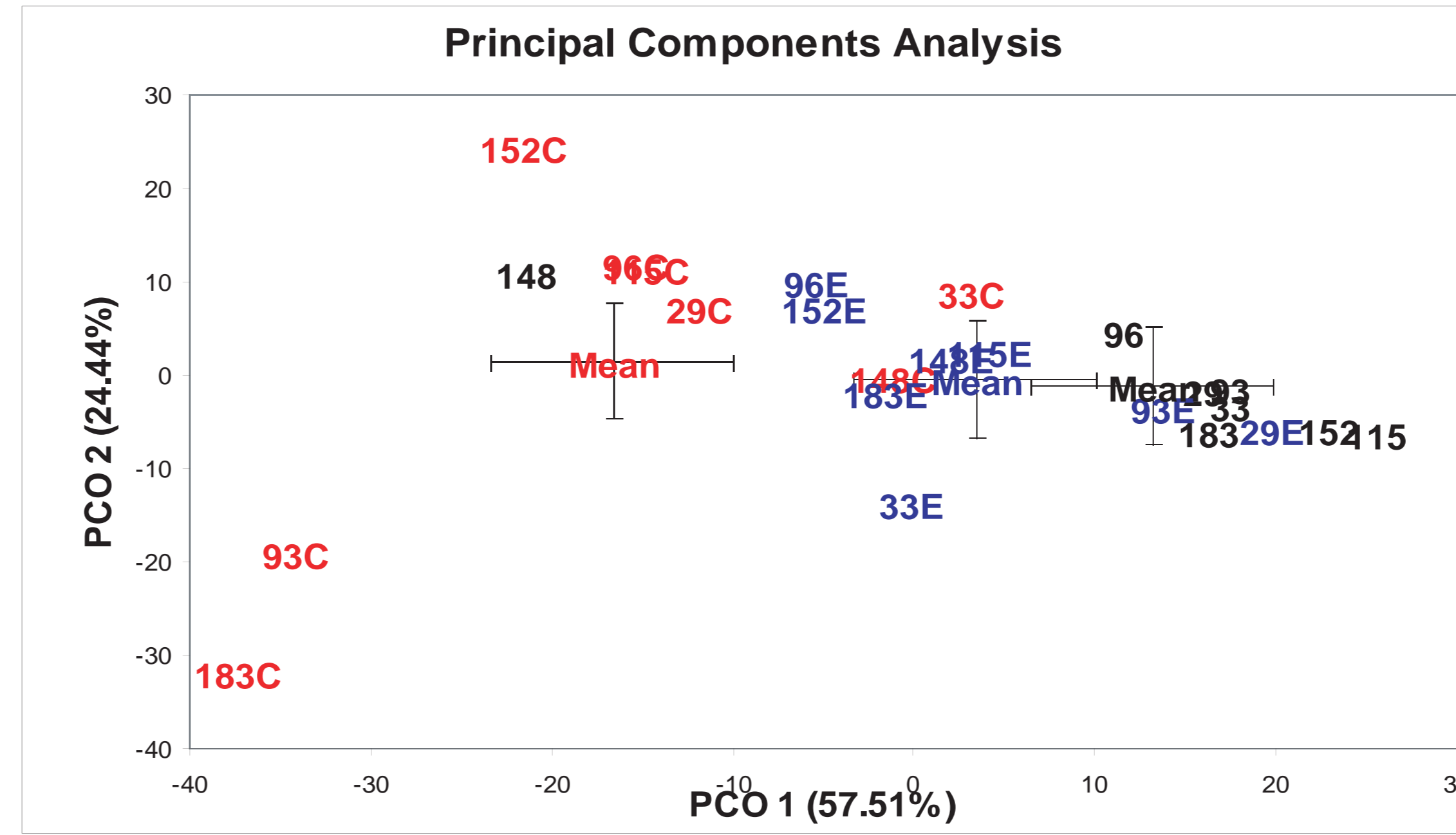
Potential nitrification shows clear spatial and temporal structure in a barley field at SCRI (Abstract 2406). No clear corelation between PNR and background measures. We aim to test the hypothesis that PNR is linked to nitrifier population structure and/or size.



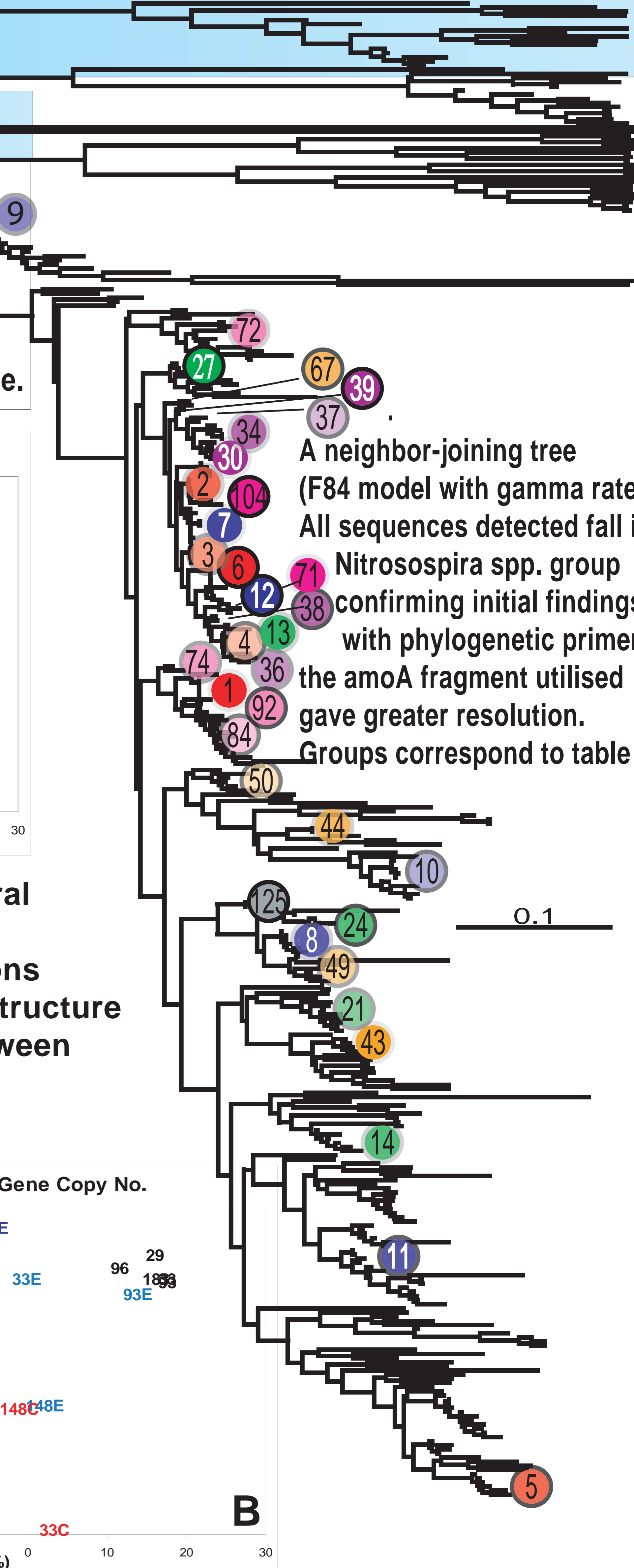
Potential nitrification is spatially and temporally variable. Krig plots represent the distribution of activity across the field site. Sampling locations for community structure analysis are indicated.

Method

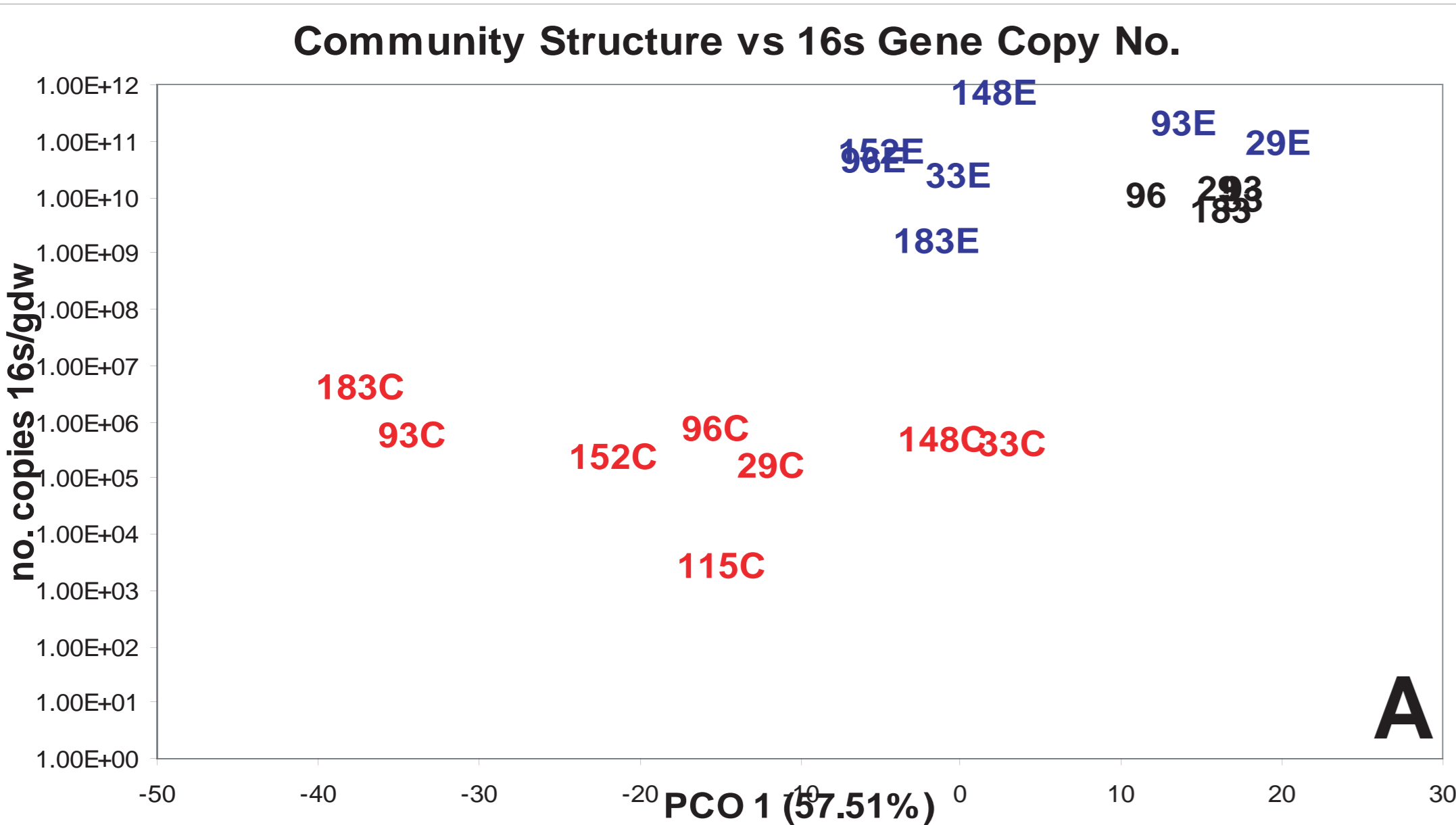
Potential nitrification estimated. AmoA gene fragment used as marker of Nitrifier populations. High-throughput sequencing applied on selected samples to assess nitrifying population complexity. Relative real time PCR applied to estimate population size.



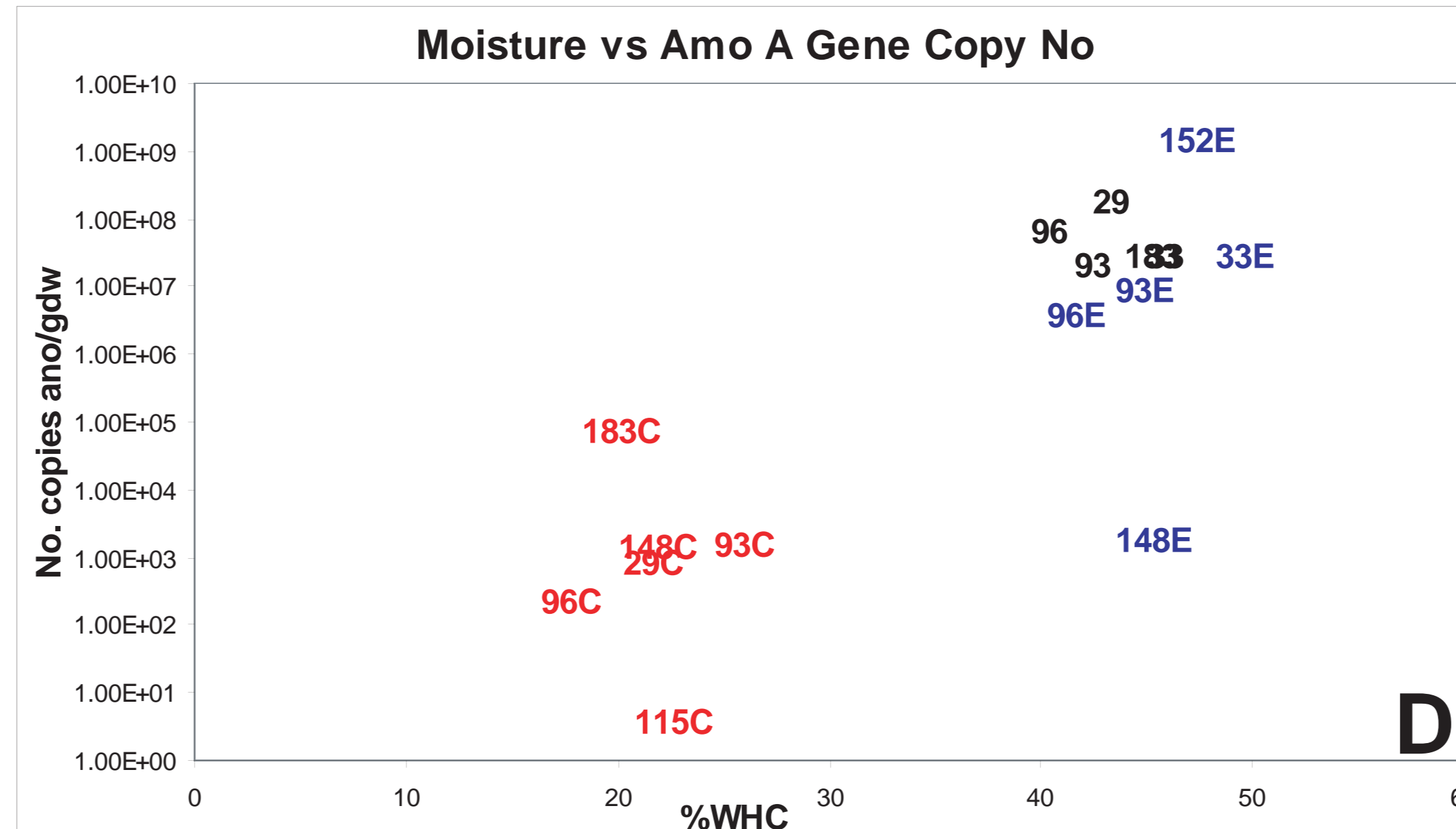
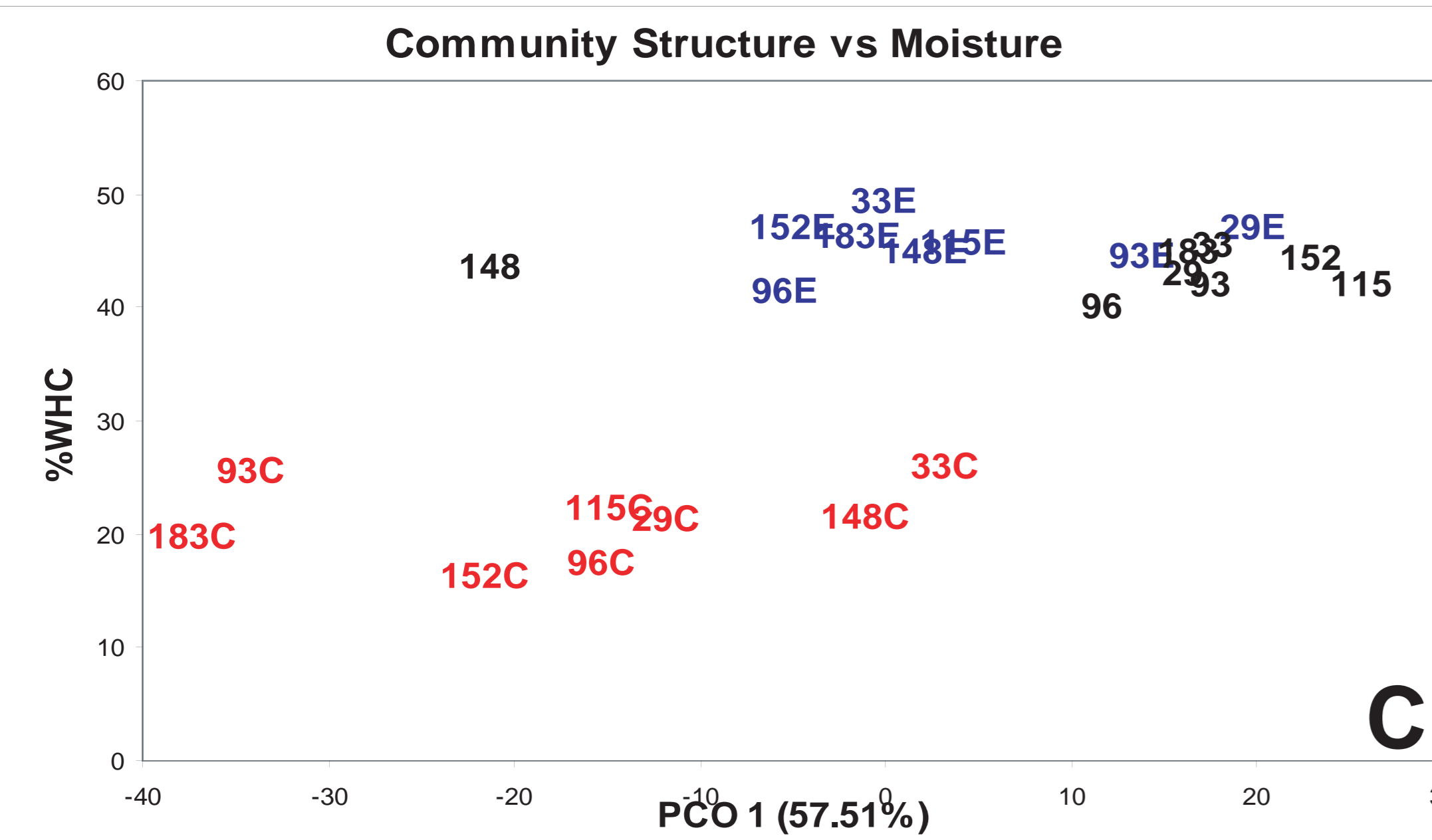
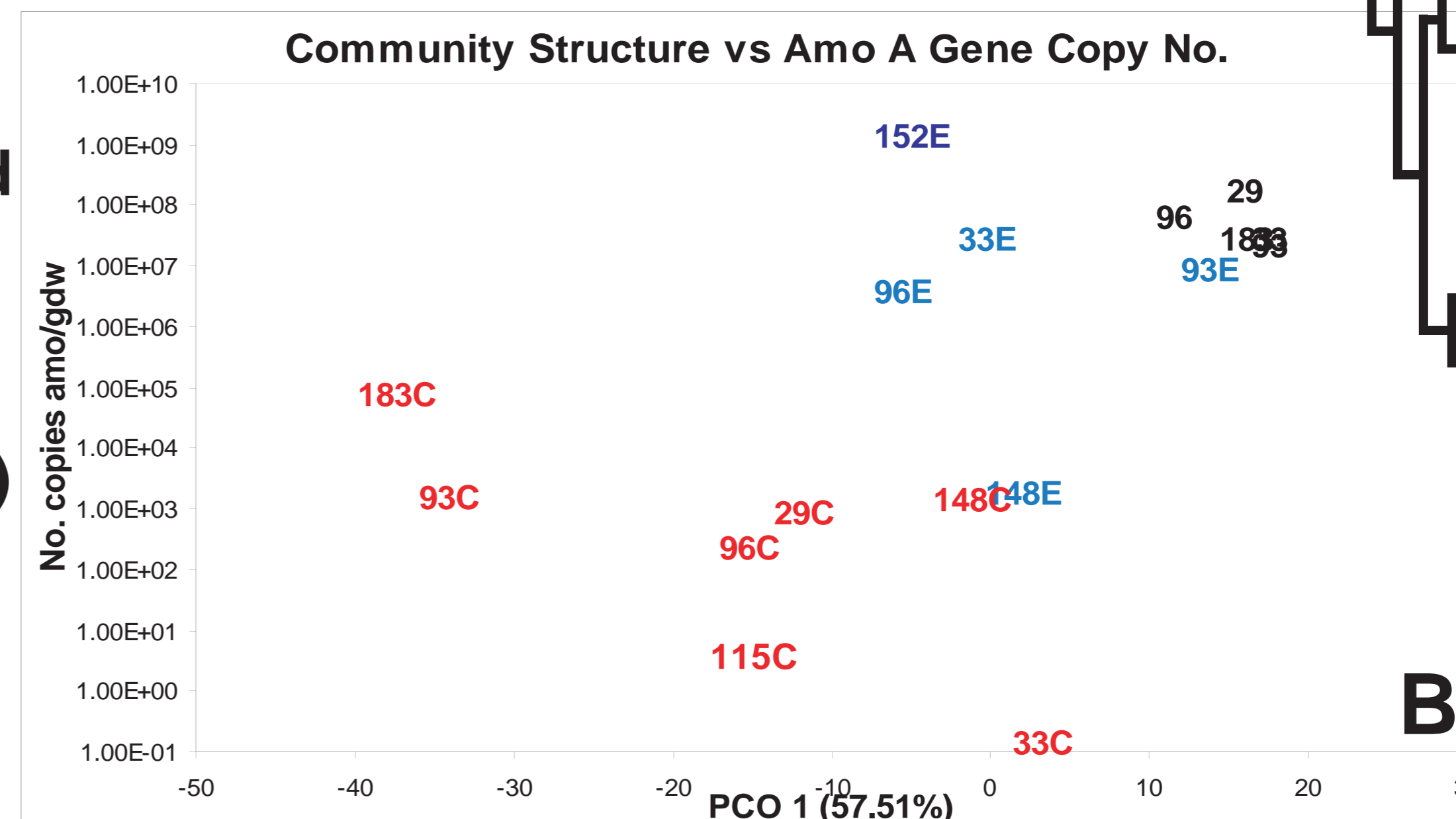
Multivariate analysis demonstrates a clear temporal but no apparent spatial effect in PCO 1. There are no identifiable effects in other dimensions. Loadings suggest that the observed community structure effect is primarily due to a shift in dominance between groups 1 and 5.



A neighbor-joining tree (F84 model with gamma rates). All sequences detected fall in *Nitrosospora* spp. group confirming initial findings with phylogenetic primers, the amoA fragment utilised gave greater resolution. Groups correspond to table



Link between change in community structure and population size of both nitrifiers (A) and total eubacteria (B). Link between moisture content and nitrifier population structure (C) and size (D). There is no apparent spatial relationship in population size



Summary

Potential nitrification rate, nitrifier community structure and population size respond dynamically over a crop cycle. Population size shift may reflect a depression of total eubacterial population.

Distribution of sequence types expressed as relative abundance

Sample	Sequence Groups																									single clones	total no clones									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	21	23	24	27	30	34	36	37	38	39	43			44	49	50	67	69	71	72	74	84
Time Pont 1 April	29	33	93	96	115	148	152	183	29C	33C	93C	96C	115C	148C	152C	183C	29E	33E	93E	96E	115E	148E	152E	183E	2.7	75										
Time Pont 4 June	29C	33C	93C	96C	115C	148C	152C	183C	29E	33E	93E	96E	115E	148E	152E	183E	2.4	82																		
Time Pont 6 September	29E	33E	93E	96E	115E	148E	152E	183E	2.4	82																										