Geographic and Substrate Distribution of Holocene Mollusks in Mid-Atlantic Offshore Deposits

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INTRODUCTION

While the paleoecology of Neogene mollusks has been studied throughout the U.S. Atlantic Coastal Plain, relatively little is known about the mollusks living on the continental shelf and how they are preserved in the Holocene record. Relationships between mollusks and the substrate in which they occur can help coastal managers target areas from which to draw sand for beach nourishment projects.
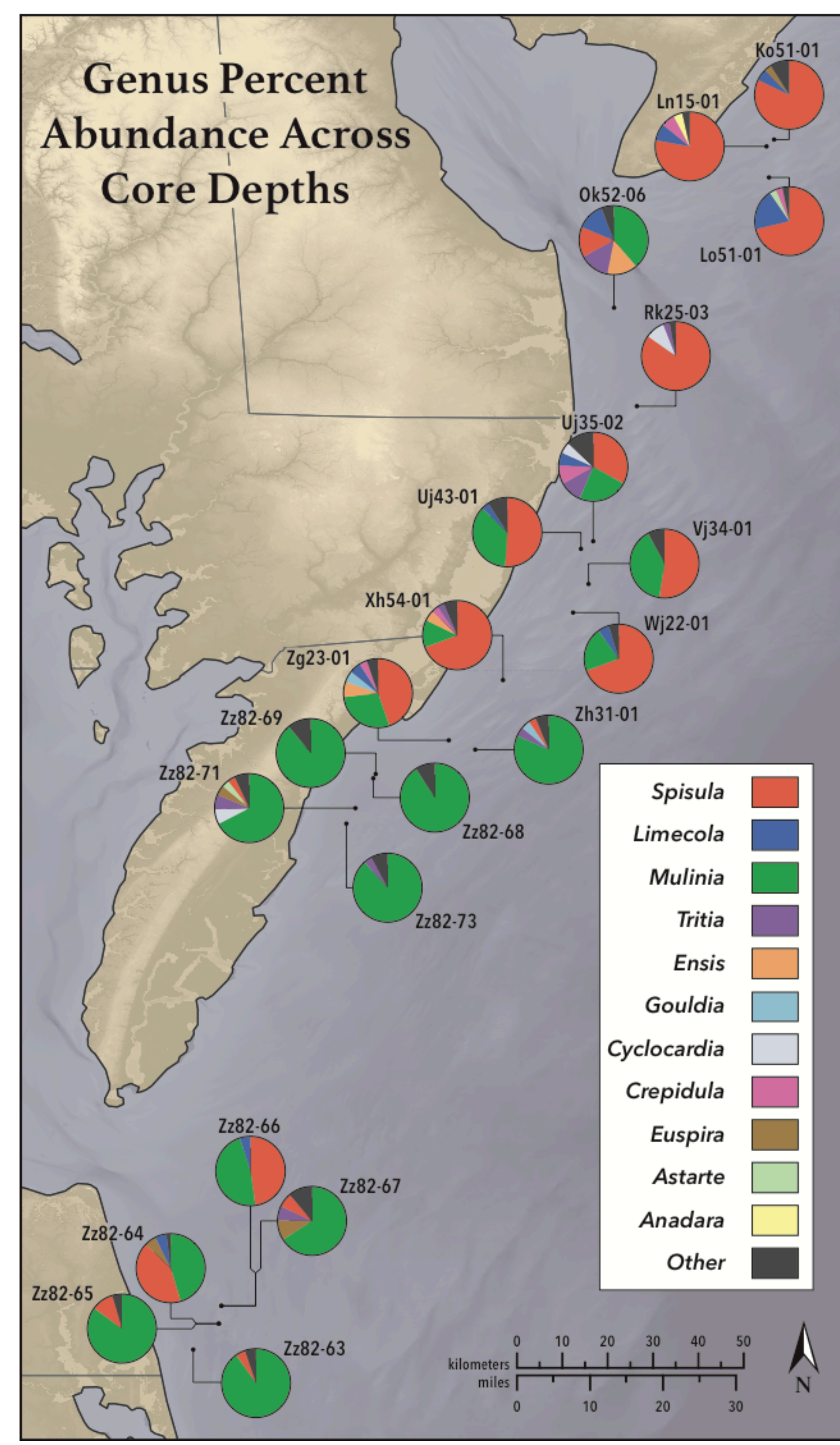
RESEARCH GOALS

1) Map offshore geographic distribution of molluscan fauna
2) Analyze relationship between abundance of mollusks and substrate

STUDY LOCATION
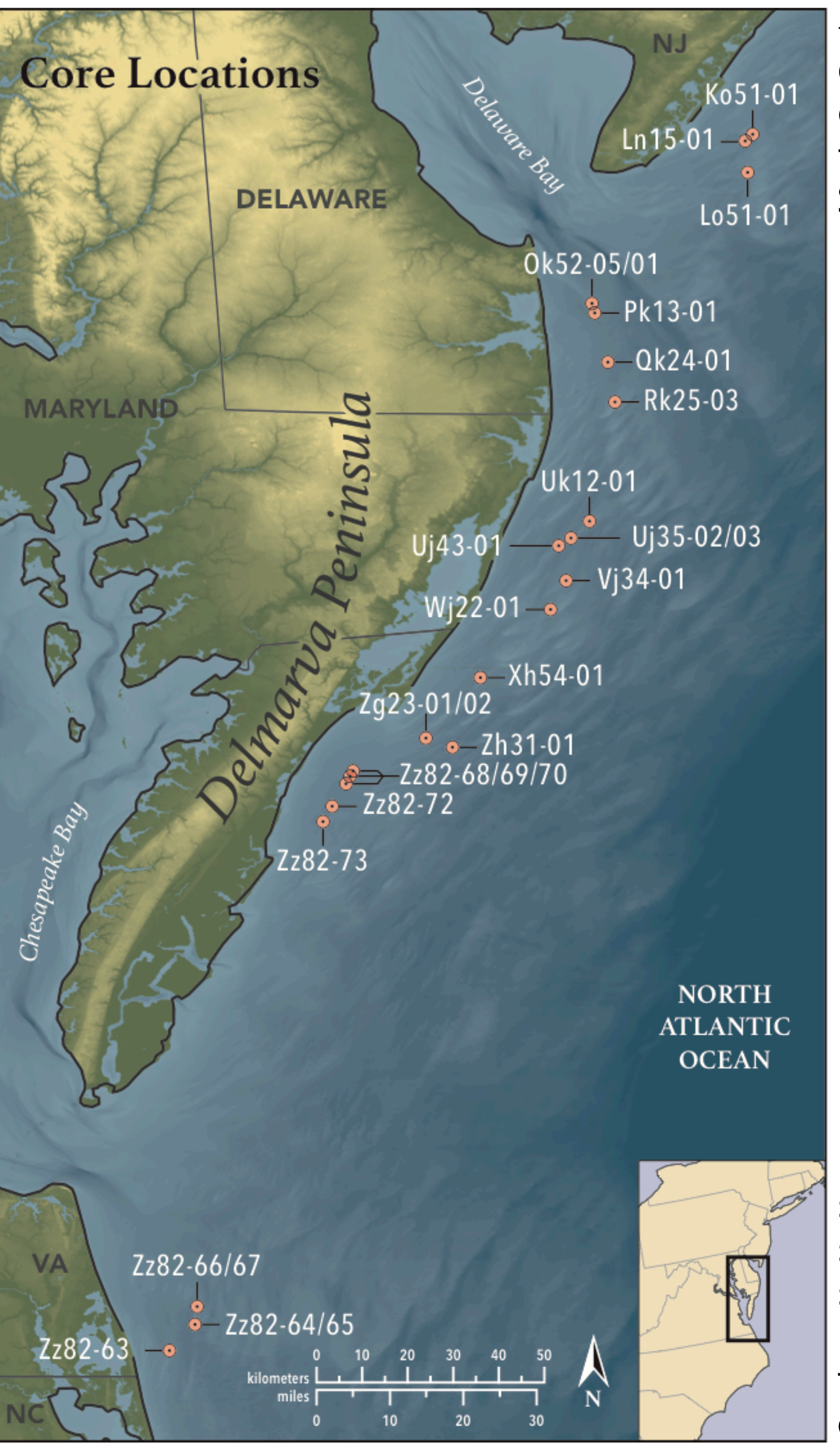
←Geographic distribution of cores analyzed for this project. Some labels pertain to multiple cores.

Example of sediment core sampled for substrate and mollusks. This is 5 through 15 feet of core Zz82-69. →

METHODS

- 24 cores collected in 2015 and 2016; funded by the BOEM ASAP project; described and sampled at the Delaware Geological Survey
- 225 samples containing shell sieved, sorted, identified, counted to 1mm
- Spearman Rank, Chao 1 Diversity Index, and Kruskal-Wallis used to examine relationship between substrate and molluscan abundance/diversity
- Cores: 15 - 20 feet long. Water depths: 40.2 - 60.0 feet.

Genus Percent Abundance Across Core Depths

Spisula dominate in cores in the northern part of the study area, whereas *Mulinia* dominate in cores towards the southern portion of the study area. Genera that comprise 3% or less of the core are categorized as other.


Dominant Genera in Shell Beds
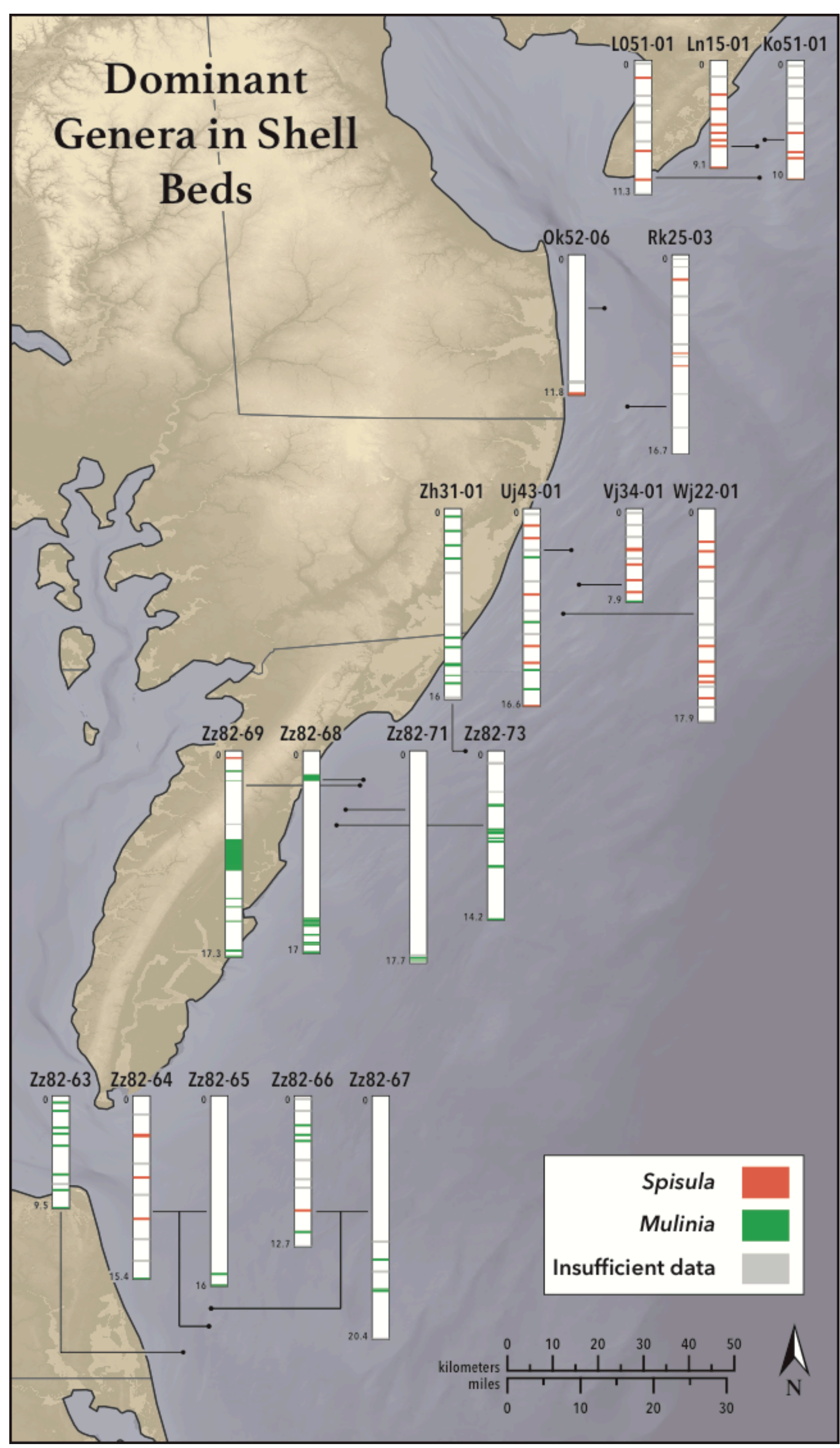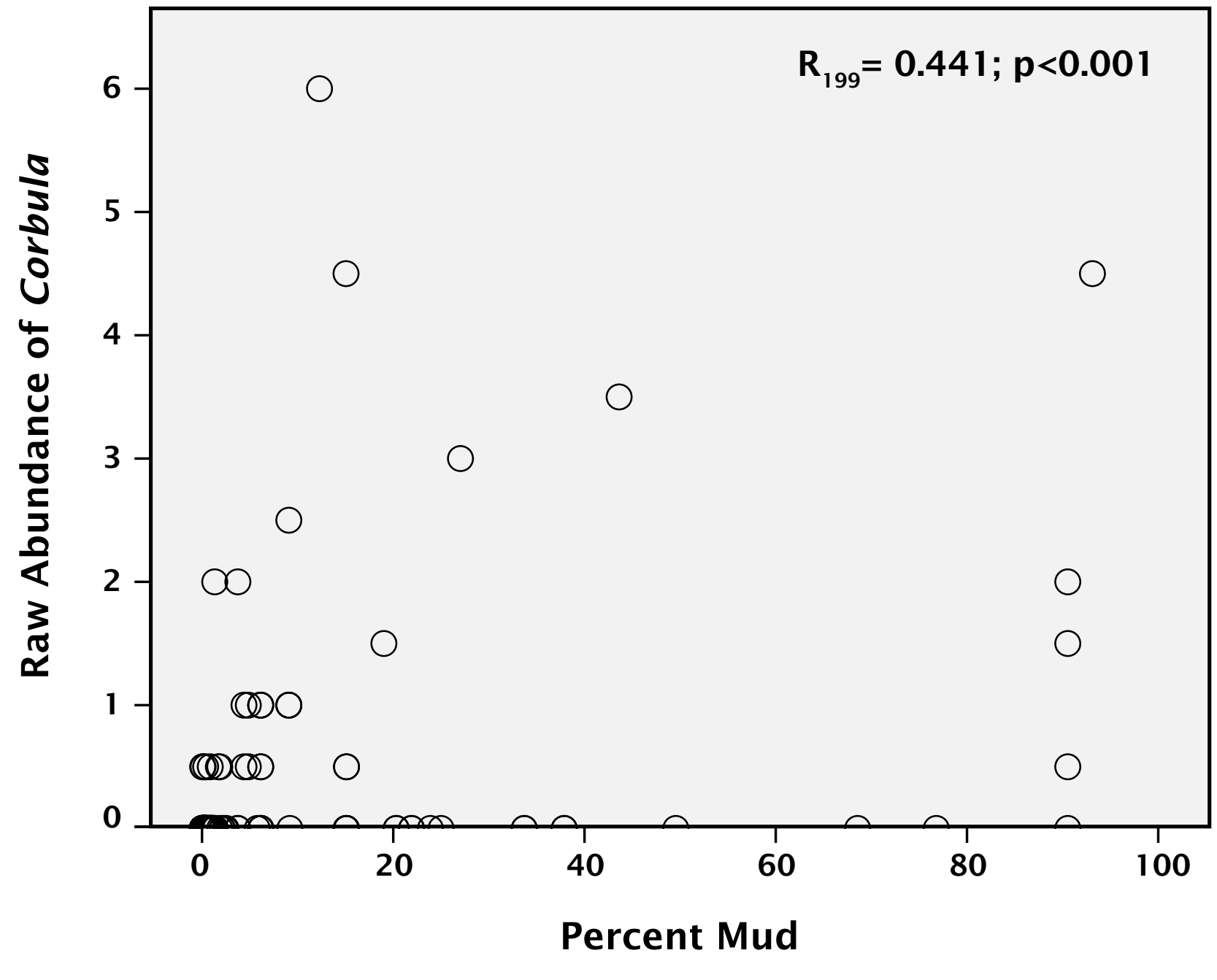
Spisula and *Mulinia* dominated the majority of samples processed from the cores. A taxon was considered dominant if it represented more than 50% of molluscan abundance. Only samples with more than 10 individuals plotted.

ABUNDANCE & SUBSTRATE

- *Corbula* abundance increases with increasing mud
- *Spisula* abundance increases with increasing sand
- *Nucula* abundance increases with increasing gravel
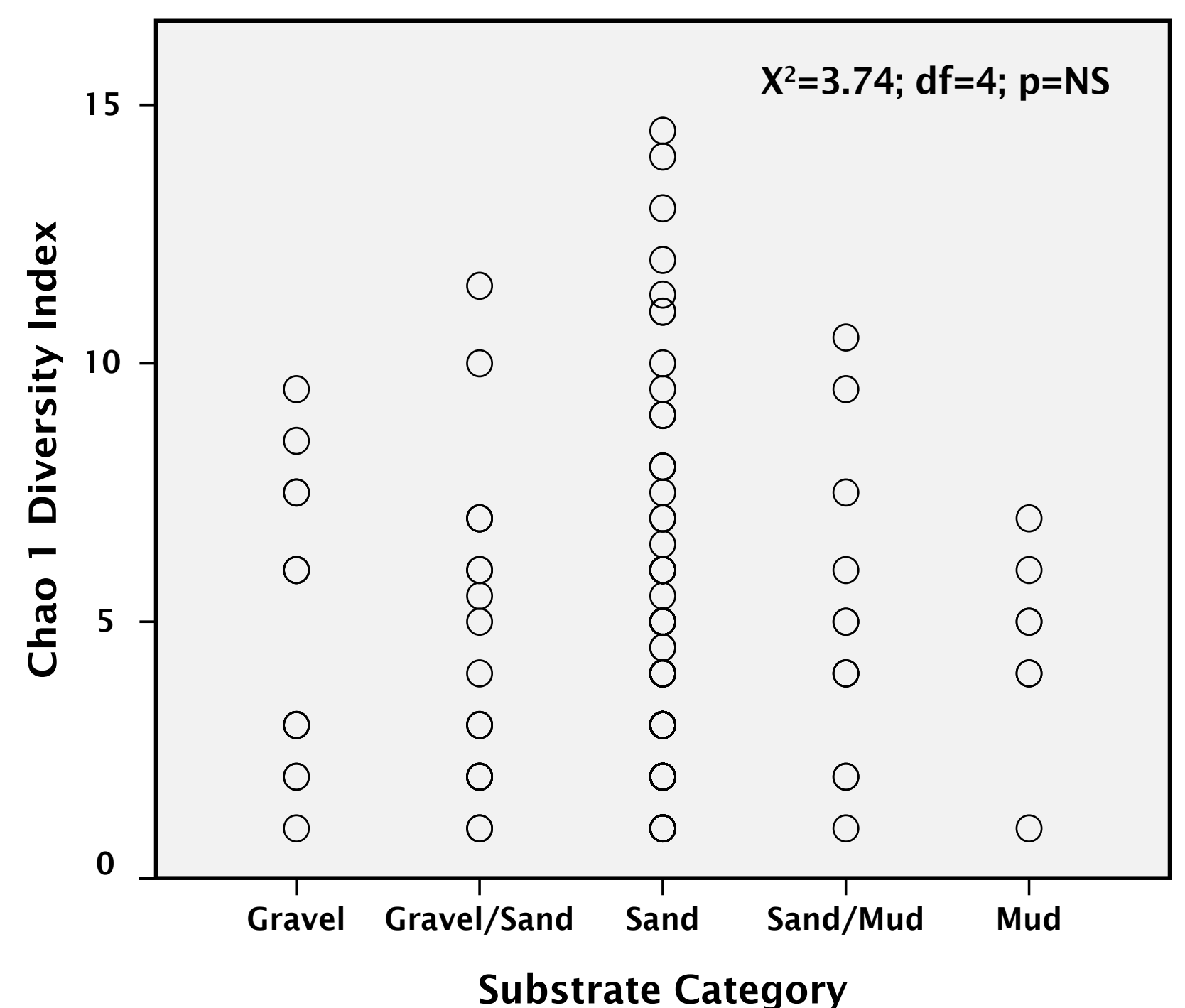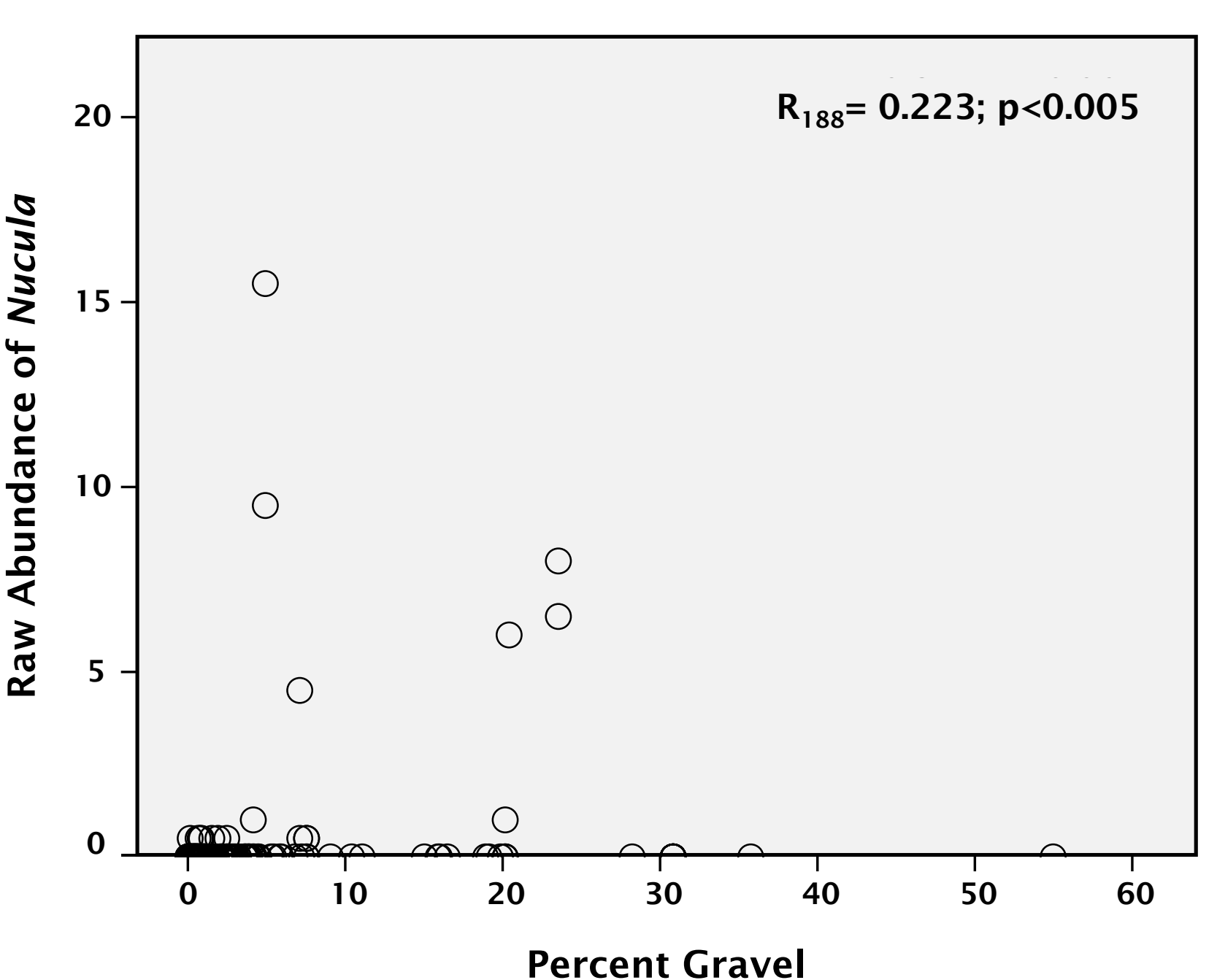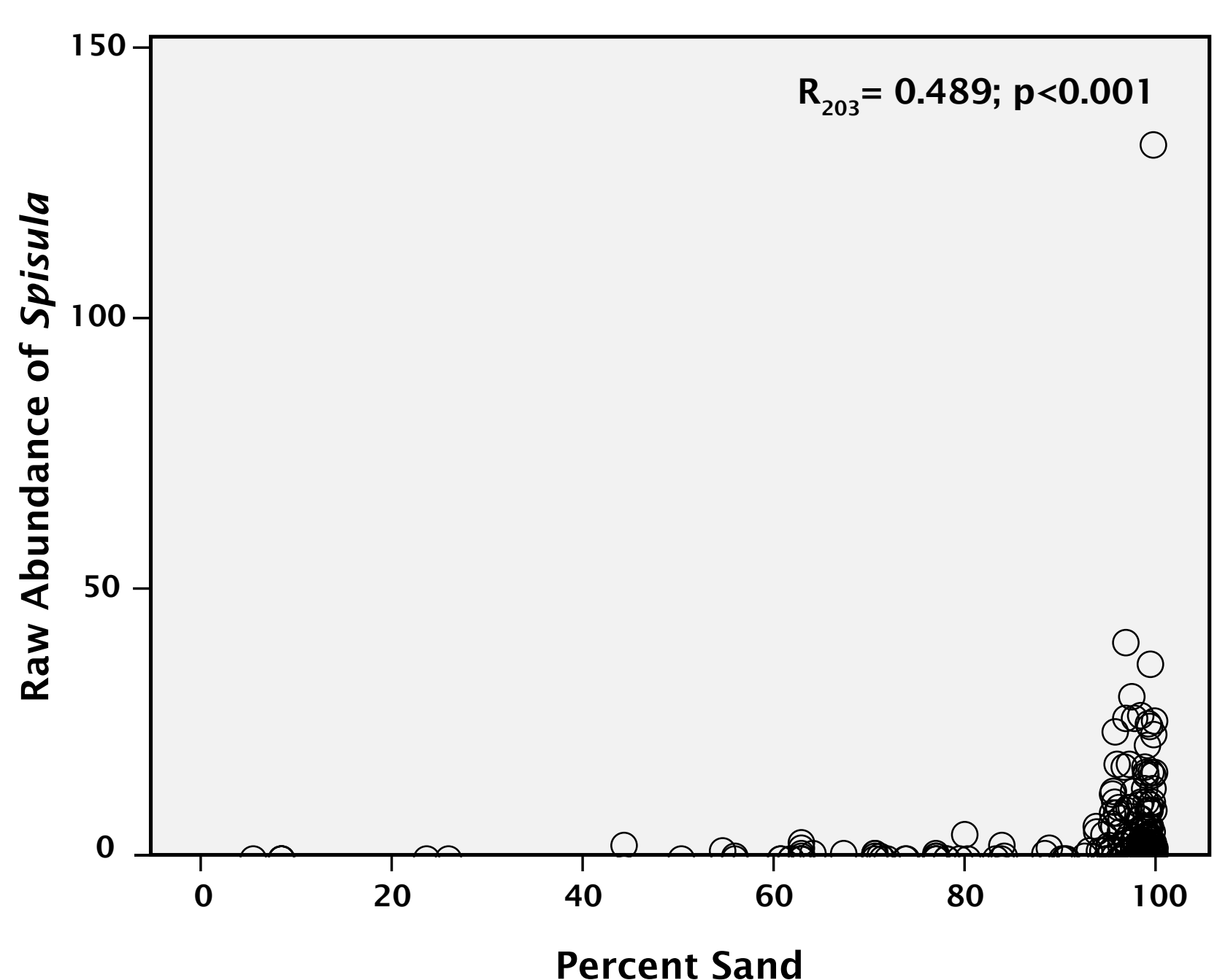
The Chao vs. Kruskal-Wallis analysis displays differences in diversity across substrate category. Molluscan diversity is somewhat higher in sandy, versus muddy or gravelly, environments.
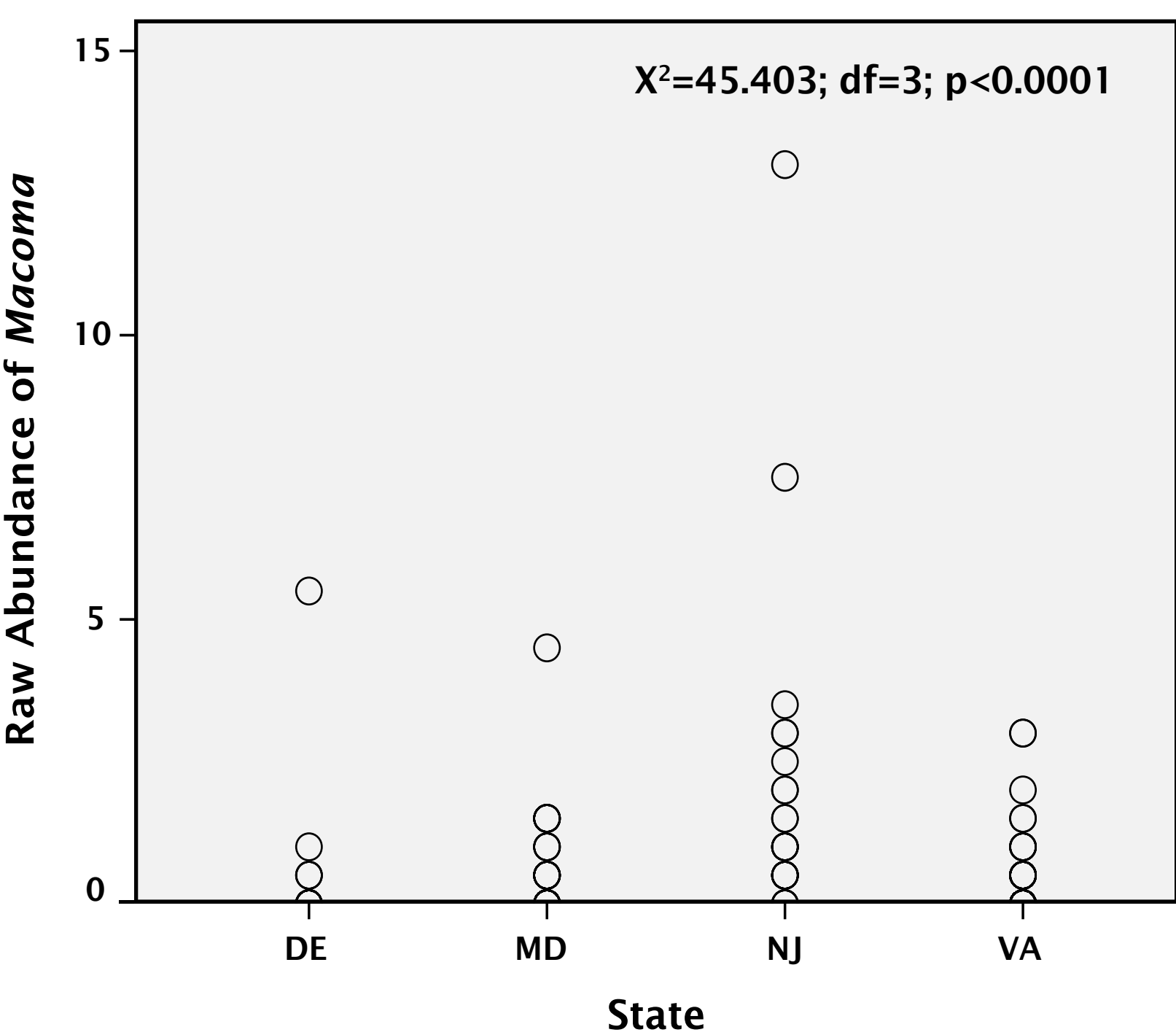
The Kruskal-Wallis analysis displays differences in raw abundance among states. *Macoma* was most prevalent in New Jersey.

RESULTS

- 7,030 specimens, representing 33 genera
- Specimens: 0.5 - 595.5 per sample (mean = 27.7)
- Genera: 1 - 13 per sample (mean = 4)
- Most common taxa recorded are *Mulinia*, *Spisula*, *Tritia*, *Limecola*

Three most abundant taxa. From left to right: *Spisula*, *Mulinia*, *Tritia*.

CONCLUSIONS

- There is a taxonomic gradient from *Spisula* to *Mulinia* from north to south
- The strong correlation between abundance of *Spisula* and percent sand could be useful in determining beach nourishment sources
- Samples offshore of Delaware and Maryland are more diverse than those offshore Virginia

ACKNOWLEDGEMENTS