

Investigating Long-Term Diet and Marine Resource Use in Kohala, Hawai'i

Jacqueline Lipphardt

Advisor: Dr. Julie Field, Department of Anthropology

Was there resource depression in prehistoric Kohala, and can we measure it?

The centuries prior to European contact in Hawai'i was a time of great social change. The need to produce surplus agricultural and marine products was demanded by an increasingly complex ritual system. At the same time, the population of the Hawaiian archipelago was increasing. Prehistoric Hawaiians living in Kohala needed to produce a lot of food out of a relatively marginal landscape. The agricultural fields on Leeward Kohala expanded and production intensified dramatically in the centuries before contact. It is proposed that this rapid intensification of agricultural and marine resource extraction could have depressed the natural resource base of the Kohala coast. Previous research examined the marine fish assemblage from AD 1400-1800 in Kohala, and found no evidence of resource depression; changes in diet through time did appear to be occurring, but no clear patterns emerged. However, the data set was very small spread over 5 *ahupua'a*, which is a large geographic area. This study of the mollusk assemblage was undertaken to further examine the long-term diet in Kohala with a much larger data set than the previous project.

Hypotheses and Methods

Based off foraging theory models, the following hypotheses were tested for quantitative evidence of resource depression in the Kohala assemblage:

1. Resource depression leads to a decline in high ranked species and an increase in low ranked prey
2. Resource depression results in a widening of the diet breadth to include more diverse and general resources
3. Resource depression leads to the inclusion of low ranked habitats with smaller species
4. Resource depression results in decreases in individual prey size and age.

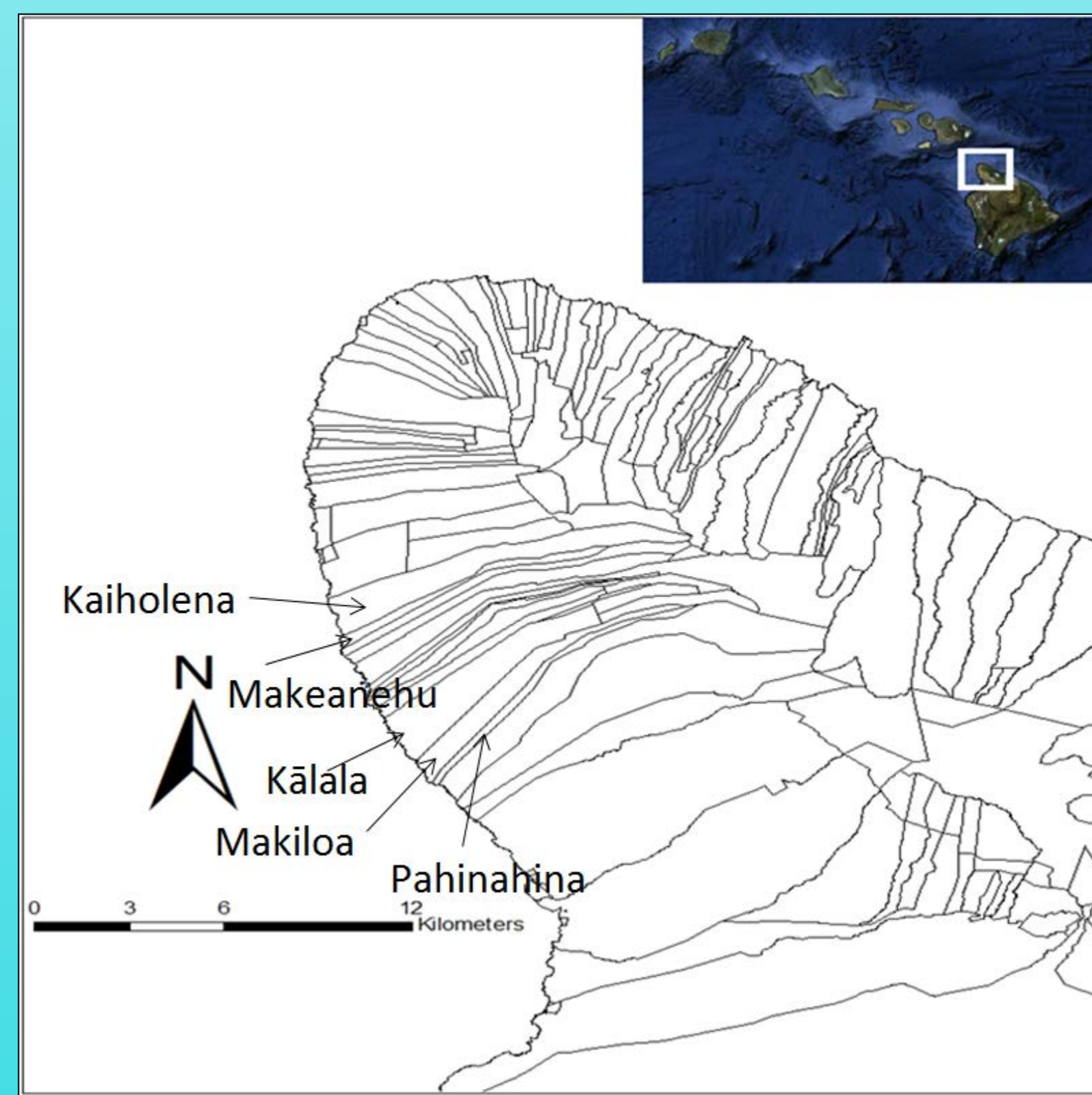
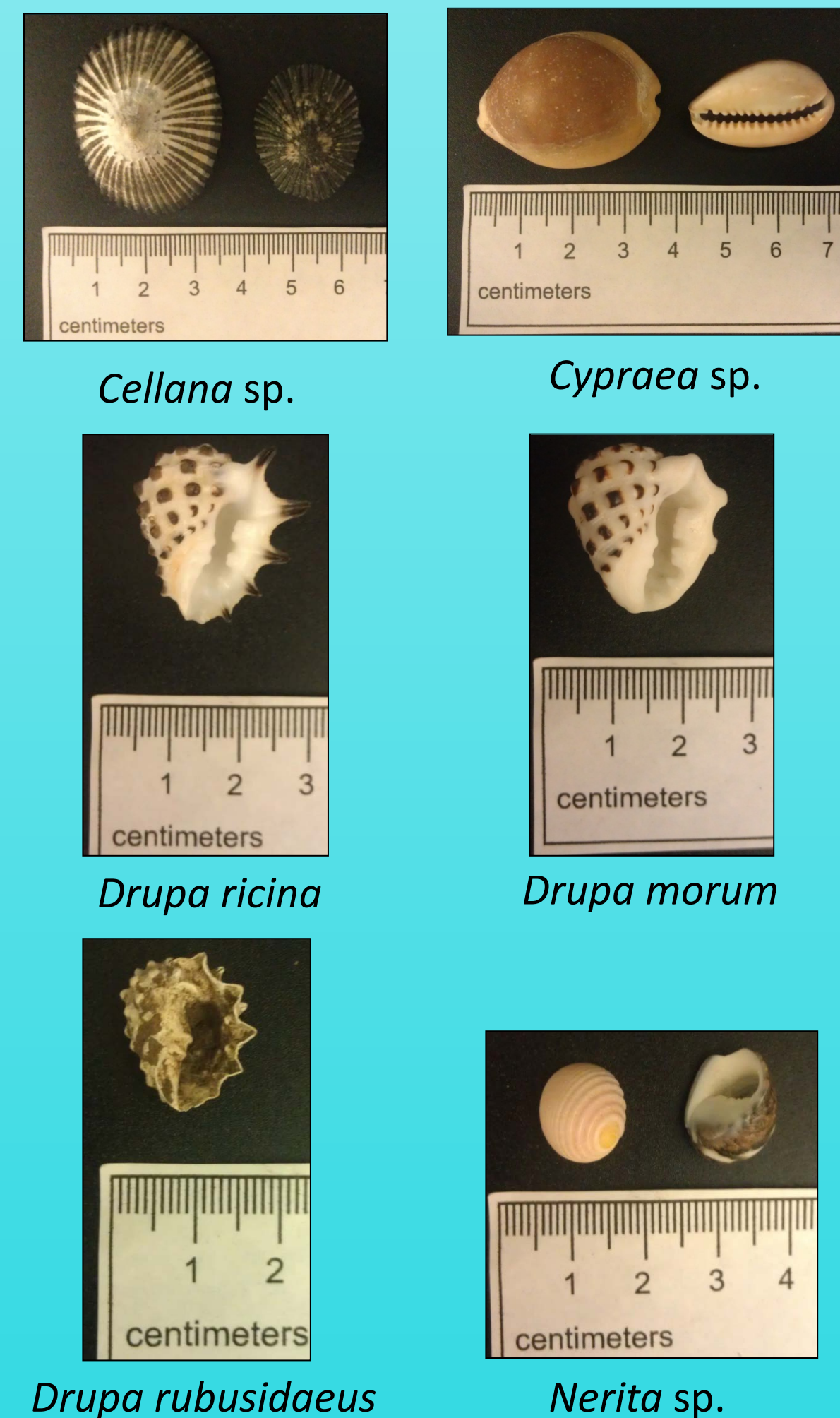
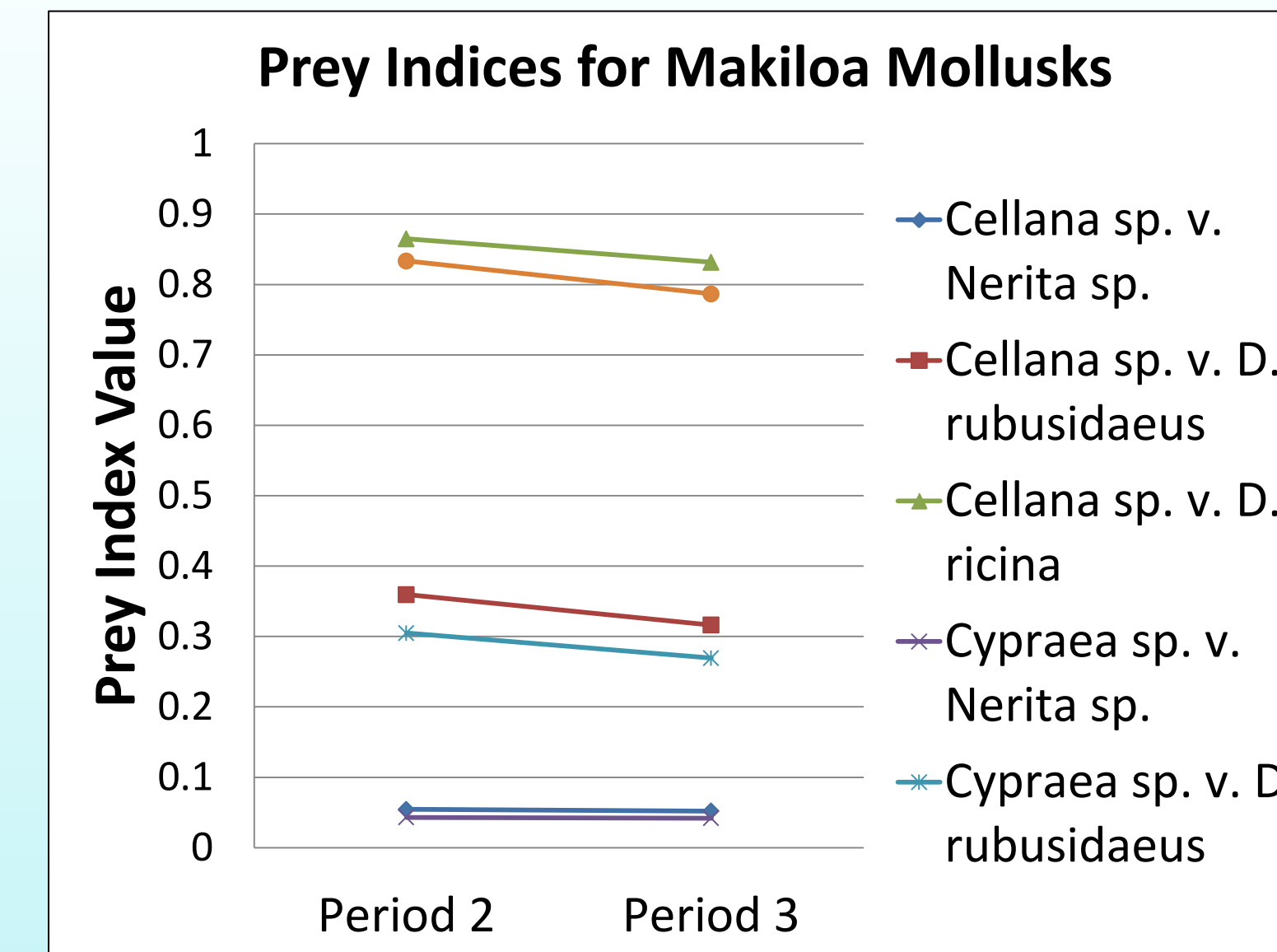


Figure 1. Kohala, Hawai'i, showing the *ahupua'a* under study in this project. Inset source: Google Earth.

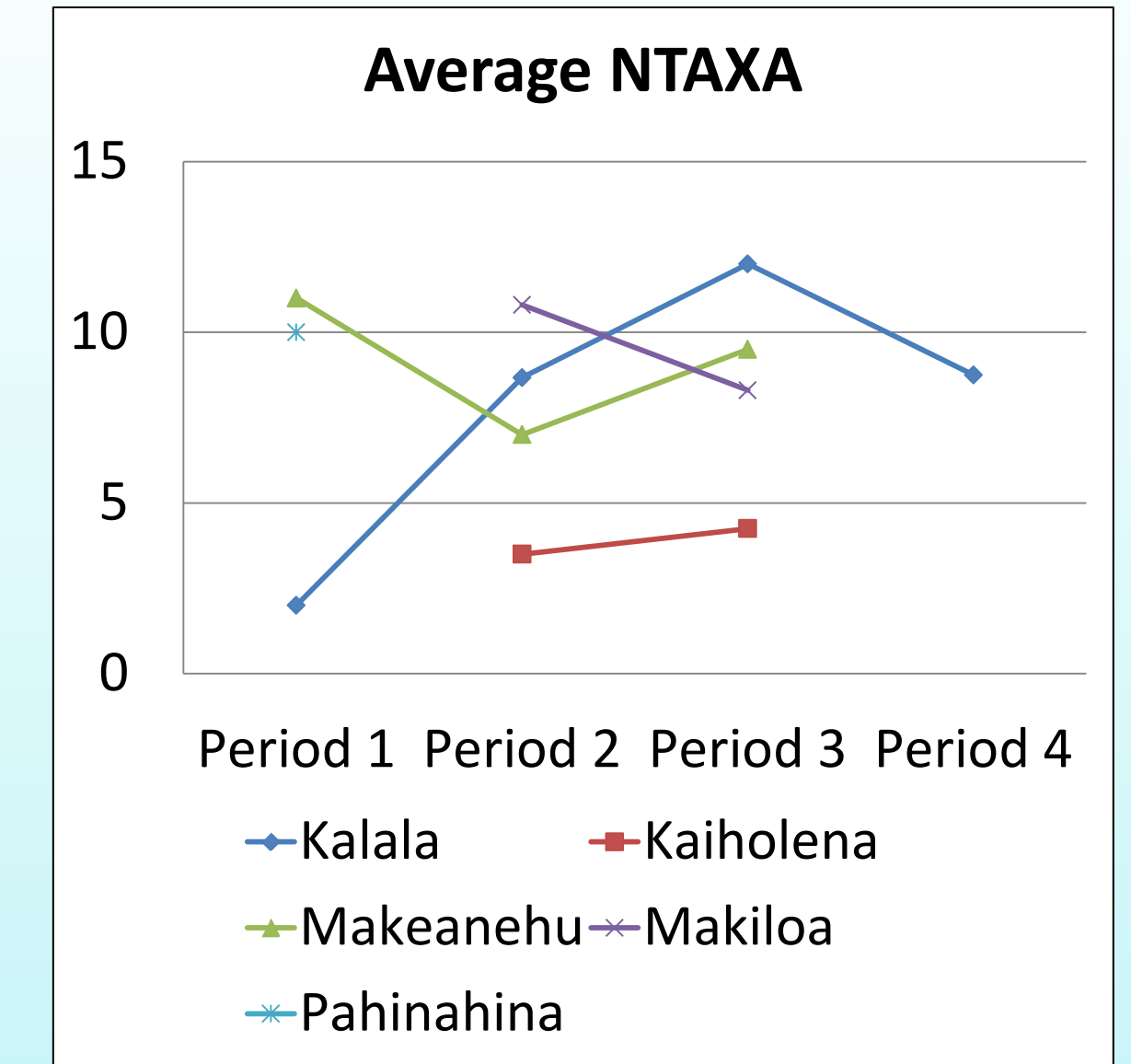
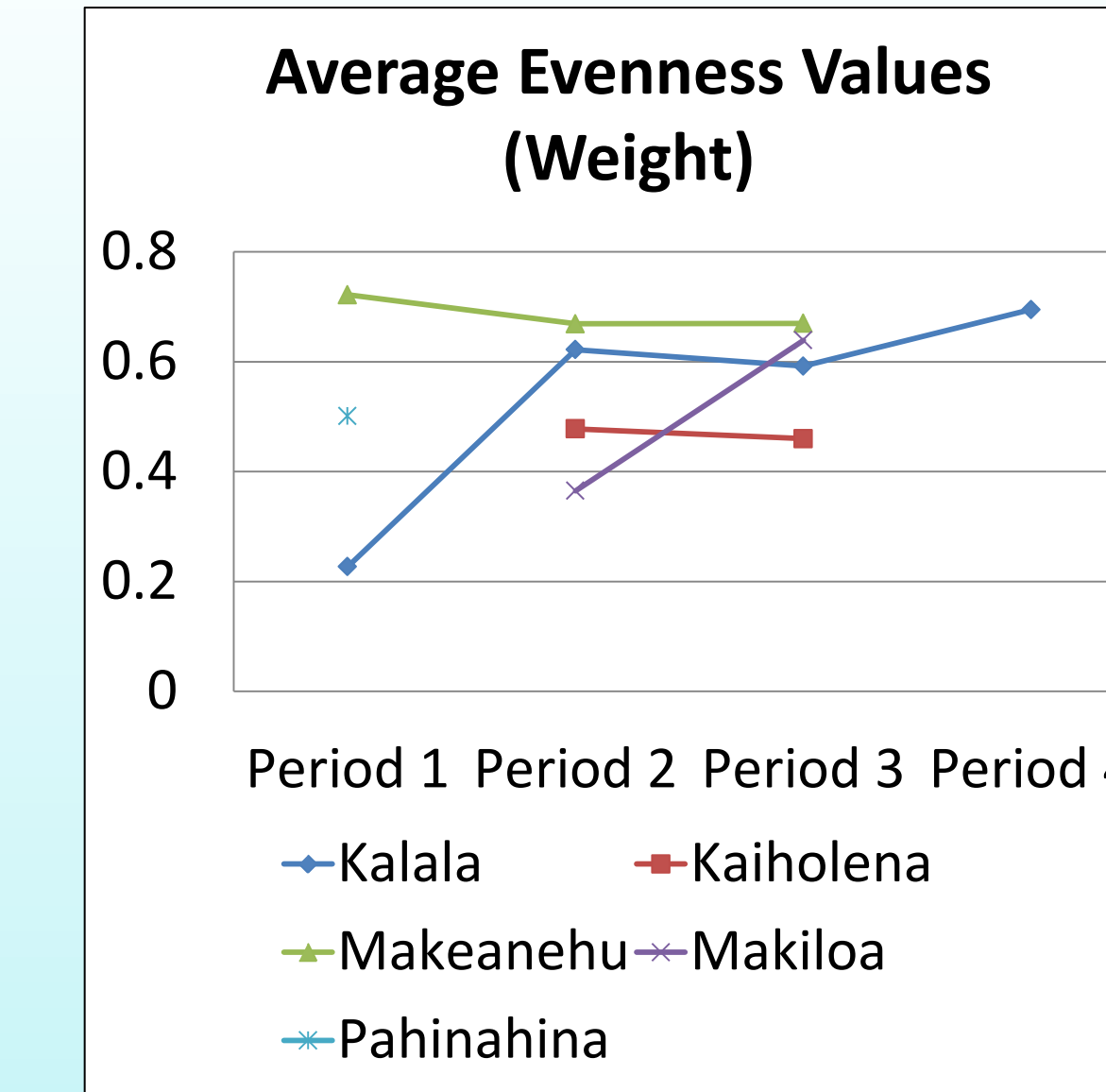
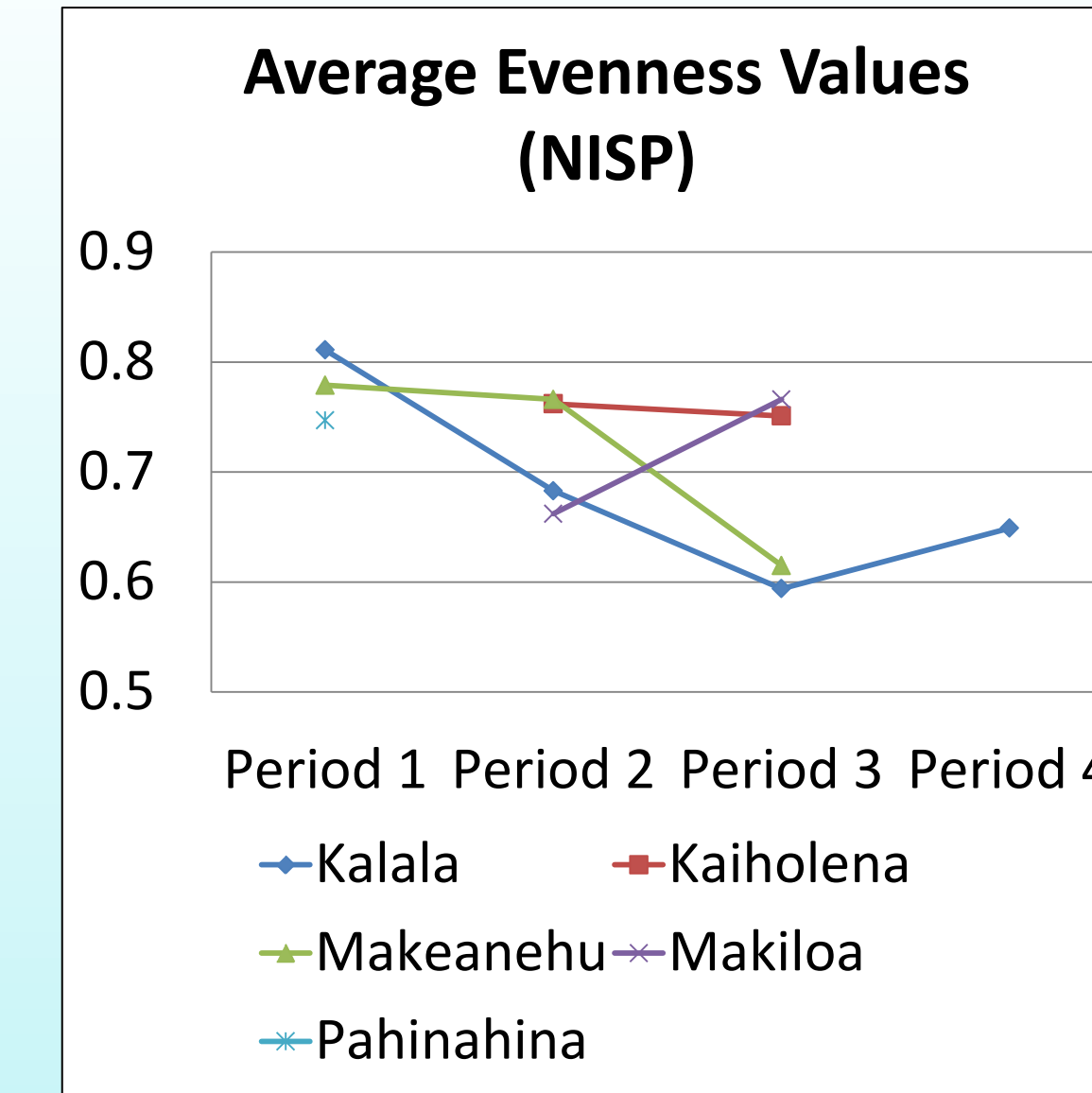


Preliminary Results

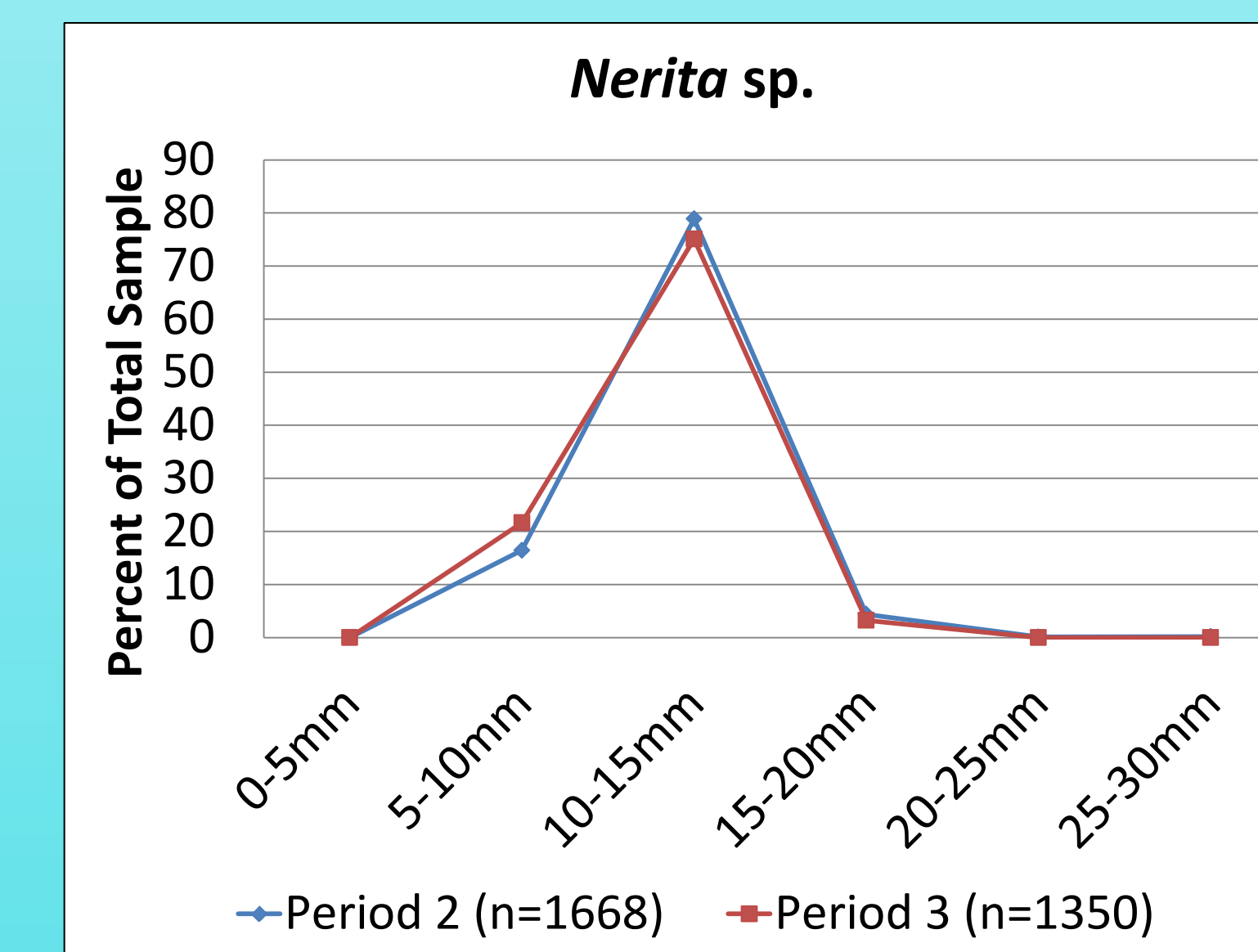
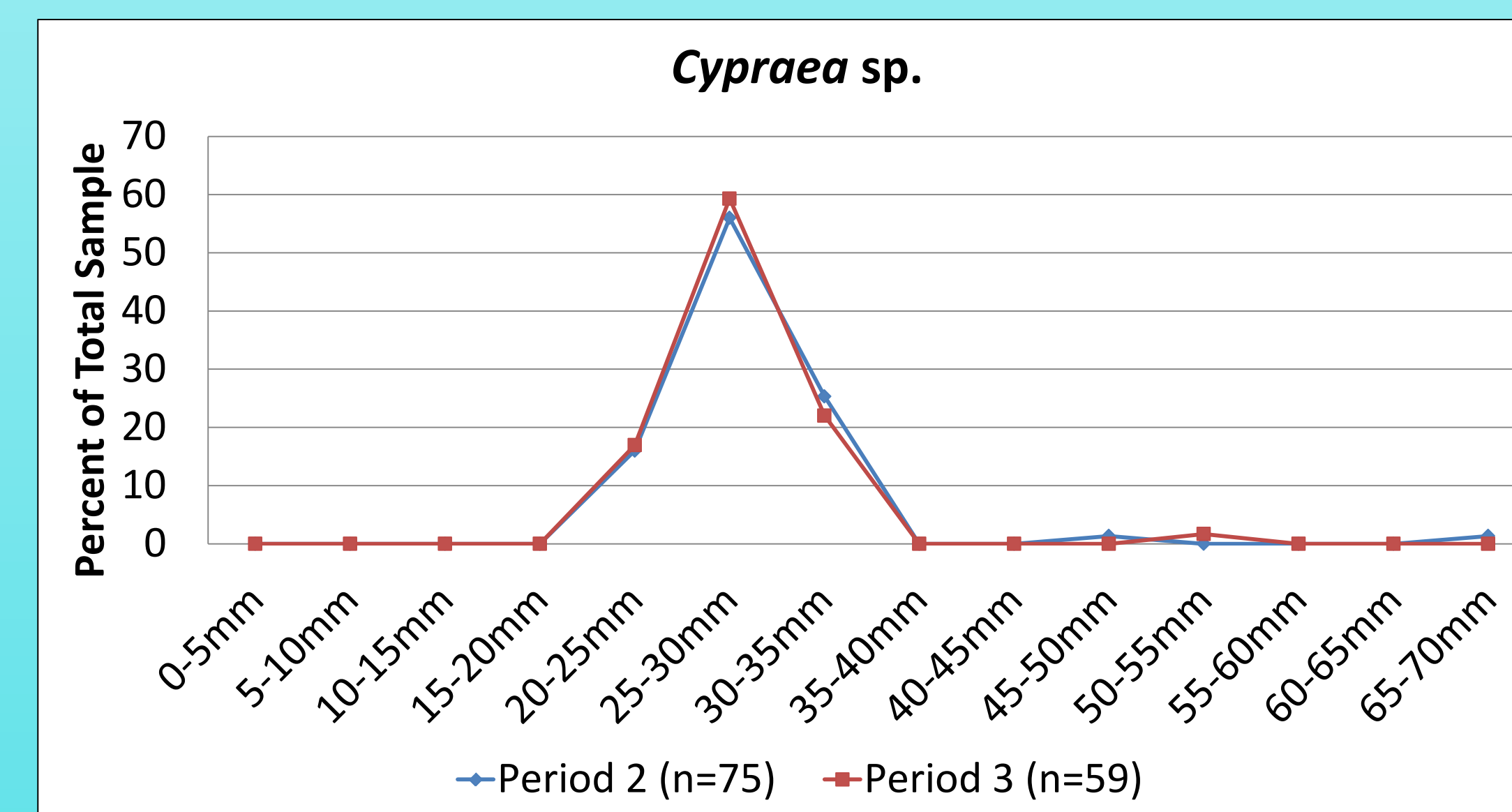
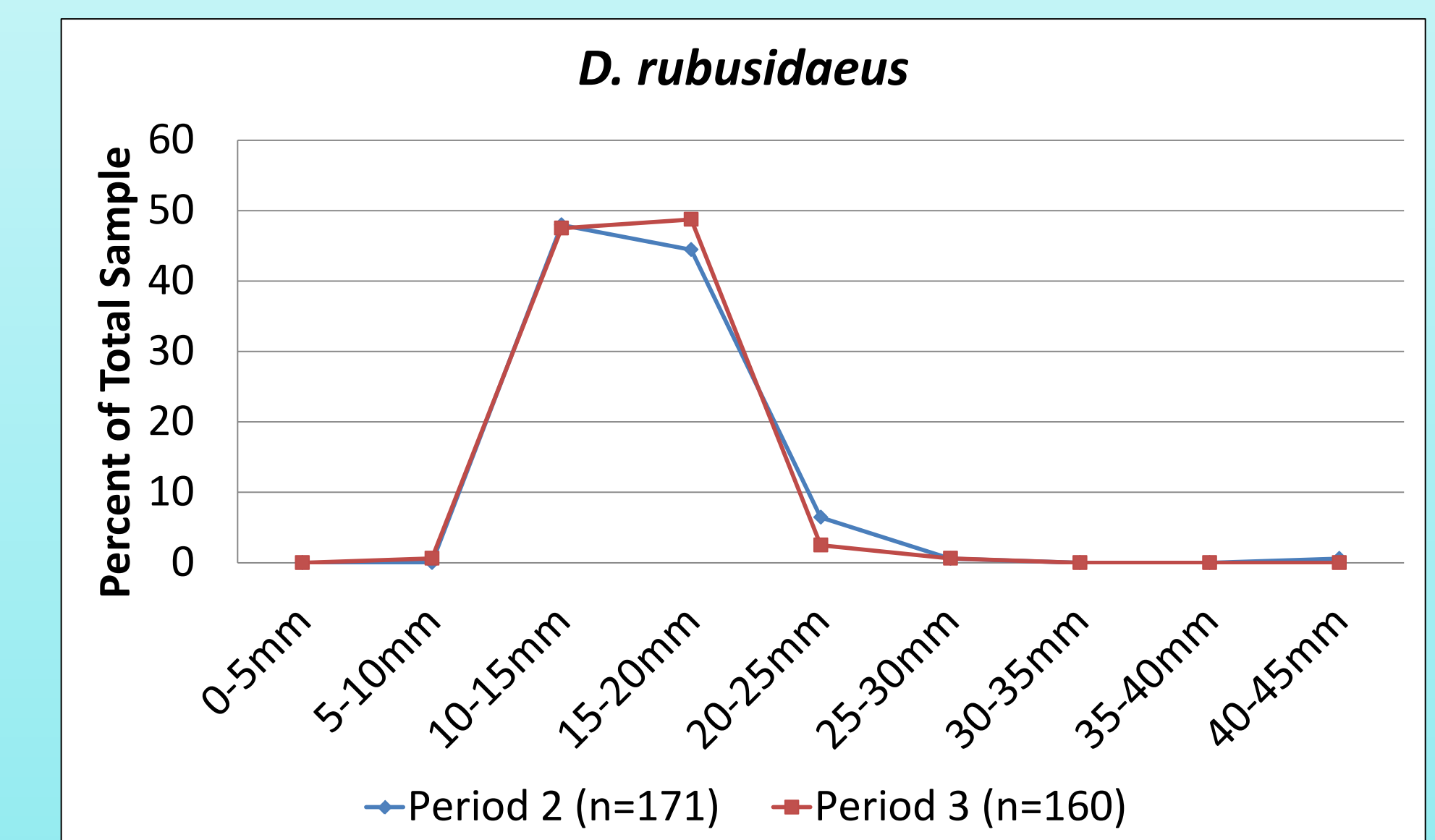
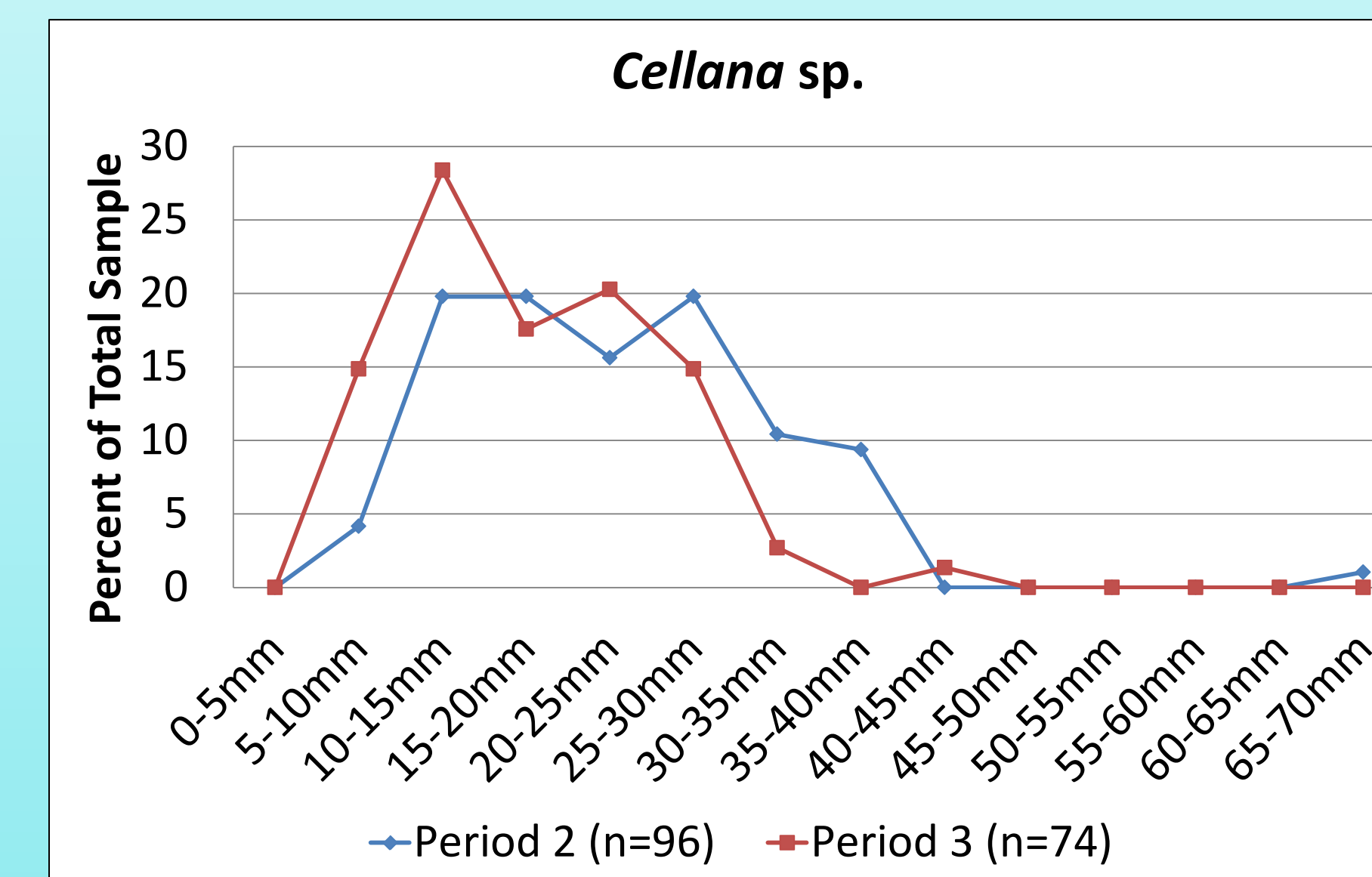
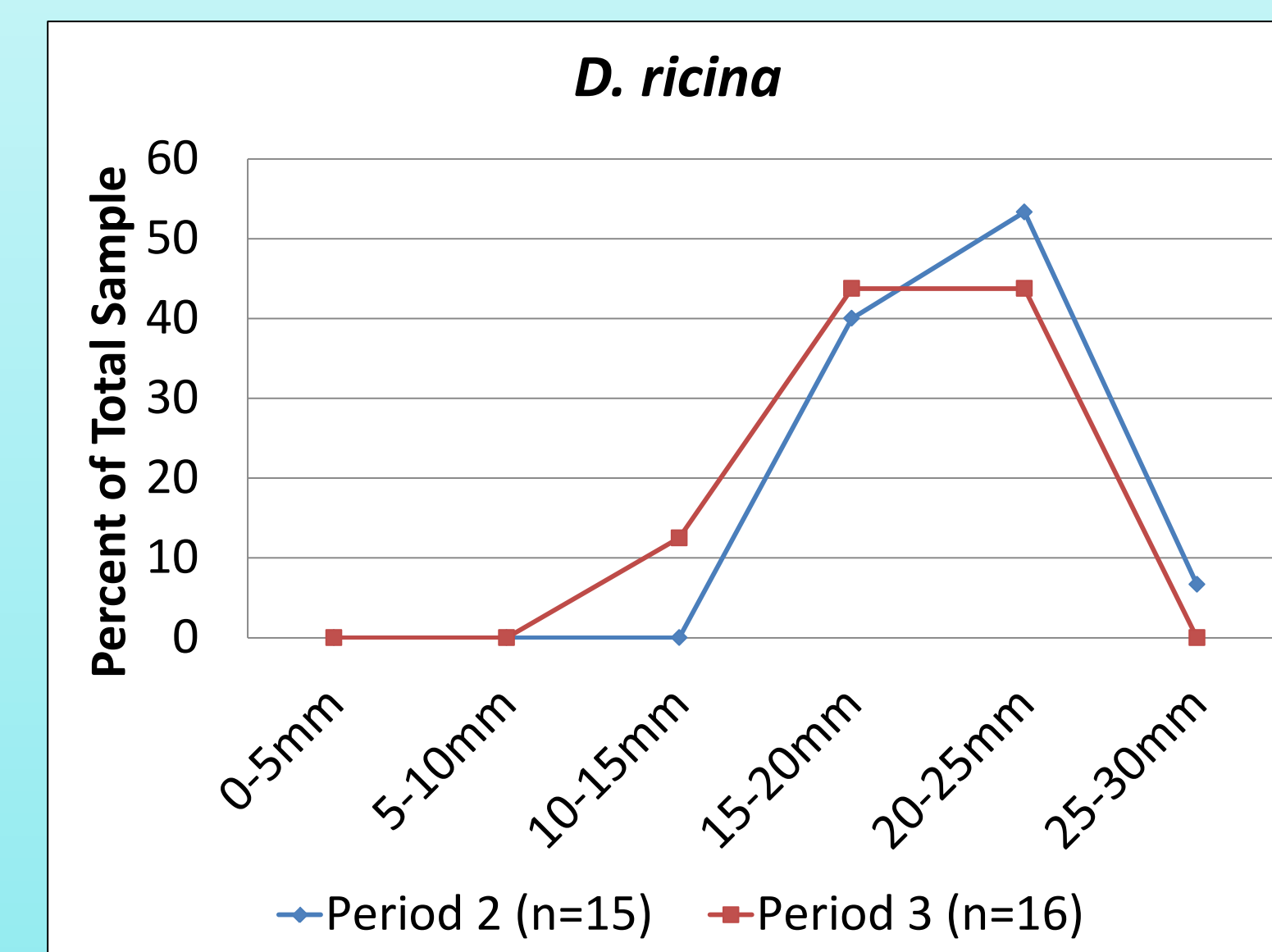
Hypothesis 1 Test: Decreases in Prey Index Values



Hypotheses 2 and 3 Tests: Increases in Evenness and NTAXA



Hypothesis 4 Test: Decreases in the Size of Mollusks



*all mollusk measurements presented here are only from Makiloa

Taxon	ANOVA	Monte Carlo
<i>Cellana sp.</i>	.0008	.001
<i>D. Ricina</i>	.2127	.216
<i>D. Rubusidaeus</i>	.0581	.046
<i>Cypraea sp.</i>	.2707	.276
<i>Nerita sp.</i>	.0001	NA

Table 1. P-values of statistical tests for changes in mollusk length

Discussion: Unexpected Results

If resource depression had been occurring, the following would need to be present: the prey index value would decline (**present**, but only available for Makiloa), the evenness values and NTAXA would have increased significantly (**absent**), and the average size of mollusks would have decreased (**present**, but only available for Makiloa). Though the project is ongoing and more data will be analyzed in the future, these preliminary results are very interesting. The patterns for each *ahupua'a* vary, and the greatest amount of data is currently available for Makiloa; however, the patterns that emerge in Makiloa are contradictory of what is expected if resource depression was occurring. The decrease in NTAXA suggests a more of a focus on select species later in time, and with the decrease in mollusk size currently seen in the Makiloa data, it is possible that overharvesting was occurring. Once the laboratory analysis is complete, it will be very interesting to see if this trend is still present, and if it is present in other *ahupua'a*.

Conclusions and Future Research

The results obtained from this study indicate that prehistoric foraging activities in Kohala were dynamic and variable through time and space. This project is in progress, and once complete will hopefully provide a clearer picture of subsistence in Kohala from AD 1400-1800.