Nested ANOVA of *Aegiope aurantia* web mesh size among varying degrees of urbanization

1. The biological issue of this study is whether or not *Aegiope aurantia* changes characteristics of their webs as a result of changes to resources caused by urbanization of their habitats. We specifically want to know if the orb web spiders studied here use smaller mesh sizes in their webs in habitats with a higher degree of urbanization, since they likely have smaller prey available in these areas compared to more natural habitats. This gets at the larger biological question of the species’, and likely other spider species’, ability to adapt in response to changes due to urbanization of habitats.
2. The statistical test appropriate for the experimental design is a nested mixed model ANOVA test since the specific locations sampled are nested within a fixed effect which is the category of urbanization. The specific locations are proposed to add to the variation of mesh size and is the random factor in our experimental design. The model is

where alpha is our fixed effect of classification for degree of urbanization, and beta is the nested, random effect which is the different location of sites nested within each classification. Mu represents some true mean mesh size for all of the locations and epsilon refers to the random error for every replicate in every location, in every classification of urbanization. If the null hypothesis is rejected