Galling sap-feeding insects are presumed to cause only minor changes in host plant tissues, because they usually do not require development of nutritive tissues for their own use. This premise was examined through comparison of the histometry, cytometry and anatomical development of non-galled leaves and galls of Calophya duvauae (Scott) (Hemiptera: Calophyidae) on Schinus polygamus (Cav.) Cabrera (Anacardiaceae). Cell fates changed from non-galled leaves to galls during the course of tissue differentiation. C. duvauae caused changes in dermal, ground, and vascular systems of the leaves of S. polygamus. Its feeding activity induced the homogenization of the parenchyma, and the neoformation of vascular bundles and trichomes. The histometric and cytometric data revealed compensatory effects of hyperplasia and cell hypertrophy in the epidermis, with hyperplasia predominating in the adaxial epidermis. There was a balance between these processes in the other tissues. Thus, we found major differences between the developmental pathways of non-galled leaves and galls. These changes were associated with phenotypic alterations related to shelter and appropriate microenvironmental conditions for the gall inducer. The non-differentiation of a typical nutritive tissue in this case was compared to other non-phylogenetically related arthropod gall systems, and is suggested to result from convergence associated with the piercing feeding apparatus of the corresponding gall-inducer.

Keywords
Hemipteran gall, histometry, developmental patterns, cell fates.