

Integrated Pest Management: Holistic Approaches to Managing Pests in Herbarium Collections

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The Herbarium at California Botanic Garden (RSA) holds over 1.25 million vascular plant specimens, making it the 3rd largest herbarium in California. With over 850 cabinets, a collection of this size creates an often-overwhelming challenge to prevent, mitigate, and manage pest infestations. Further, pest management at this scale requires dedicated personnel and time, which was significantly hindered due to the COVID-19 pandemic. Prior to 2018, the RSA Herbarium's Integrated Pest Management (IPM) practices were primarily word of mouth protocols. Additionally, the database used at that time for monitoring pest activity was inefficient and difficult to interpret, which presented challenges with data analyses. In 2018 the Herbarium experienced a surge in *Lasioderma serricorne* (cigarette beetle) populations within the collection, which served as the catalyst to our IPM reform. Staff reviewed current IPM literature and techniques and implemented several best practice methods in conjunction with the already established quarterly check method to better track and manage pests within the collection. With the help of a skilled volunteer, we developed a database to track pest activity more accurately and to better inform our pest management strategies. We also produced a detailed written protocol and implemented this as part of our routine training for all curatorial staff. Other pest management measures included installing additional pheromone traps in all areas of the building containing herbarium cabinets, eliminating environments hospitable to pests, and implementing a routine freezing treatment on specimen pressing supplies and cabinets in areas with inadequate climate control. The overhaul of RSA's integrated pest management program over the past four years has helped us to holistically and effectively manage pests in our collection.

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