The ecology of chemical-defense polymorphisms in crop plants

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Abstract

Over the course of their domestication, crop plants have frequently undergone reduction or loss of chemical defenses against herbivores and pathogens. However, in some crops, some defenses have persisted and they appear to play diverse, but often little-understood, roles in crop ecology. Crop species that are polymorphic for chemical defenses offer unique opportunities for exploring the roles of crop chemical defenses in agroecosystems. In these coupled human and natural systems, the level of defense has consequences not only for the plant but also for how farmers organize their activities. Understanding variation in chemical defense thus requires the analysis of costs and benefits of defense not only to the plant but also to the farmers. I will examine the biocultural ecology of chemical defense in crop plants characterized by such polymorphisms, focusing on a particularly dramatic example: manioc, also known as cassava (*Manihot esculenta*, Euphorbiaceae), in which there exist both non-toxic sweet and highly toxic bitter varieties, reflecting enormous variation in the cyanogen content of the plant's tuberous roots. I will show how variation in chemical defense is central to the coevolution of the plant and the cultural practices associated with it.

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