fore two dimensions when assessing how specific an insect is - host range breadth and how “good” hosts are relative to each other. Although the host-specificity of an insect is frequently defined in relation to its complete life cycle, it can also be described for particular aspects such as pre and post alighting behaviours, adult feeding, nymphal development and oogenesis.

The distinction between fundamental and realised host range, and emphasis on the two dimensions to host-specificity, give us the conceptual framework with which to predict non-target effects both accurately and cost-effectively. The most inclusive set of plant species that could be at risk can be determined by estimating the fundamental host-range. This can be done accurately by experimentally excluding possible environmental constraints to host-range such as coincidence between insect and host (by using representative plant test lists), time-dependent effects (by using no-choice trials conducted for the duration of the insect’s life), and effects of prior experience (by using newly emerged, naive, insects). If the fundamental host-range includes non-targets we can predict what will happen under particular ecological conditions. This might include predicting field host-range (by considering possible environmental constraints), and obtaining a more complete picture of host-specificity by determining how “good” hosts are relative to each other in order to predict relative attack, and ultimately relative impact. The distinction between fundamental and realised host range can also be exploited to better assess the risk of genetic host-range expansion. Concepts of host range and host specificity, and their relevance to the host-specificity testing of potential biological control agents, are discussed further in van Klinken1.

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Brazilian Peppertree - Prospects for Biological Control

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The woody plant Schinus terebinthifolius (Anacardiaceae) Brazilian peppertree (BP) is native to South America and is common in Southern Brazil. It was first introduced into the U.S. before 1800 and then reintroduced in 1840 as an ornamental. In Florida this plant is listed as a category of invasive species by the Exotic Pest Plant Council and is estimated to infest more than 405,000 ha in central and south Florida. BP displaces native plants and disrupts natural communities, forming dense stems that reduce the biological diversity. This plant also spread in Hawaii and South Africa where it is considered a weed. Surveys for natural enemies in South America were initiated in 1987, and have continued since 1994 on a cooperative agreement between University of Florida and Federal University of Parana State. The insects bionomics like thrips Pseudophilothrips ichini Hood (Thysanoptera), sawfly Heteroperreyia hubrichi Malaise (Pergidae), leafroller
Time-Dependent Changes in Responsiveness Can Influence the Outcome of Both No-Choice and Choice Assays†

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Time-dependent changes in responsiveness incorporate physiological processes that affect central and peripheral excitation or sensitivity by an insect to plant cues. The degree of responsiveness influences if an insect will approach, alight, and accept plants for feeding or oviposition. Data on the post-alighting acceptance behavior for feeding or oviposition on different hosts help determine host preferences of oligophages. Experiments on Zygogramma bicolorata reveal that time-dependent factors influence the outcome of no-choice and choice assays. Even the preferred host plant, Parthenium hysterophorus, is not accepted for a meal if the test beetle has recently ingested a meal of a preferred host (false negative). The non-target plant Xanthium occidentale is unacceptable for feeding when the beetle is satiated. However, this plant is usually acceptable for ingestion of small meals, but only after a significantly longer period of food-deprivation. If this period of deprivation exceeds that occurring in nature, a false positive is possible. Therefore no-choice feeding assays are capable of both under- and over-estimating field host range of an agent depending on test duration. Data on outcomes of two-choice assays indicate that Z. bicolorata entering a choice test when satiated consistently rejected Xanthium for feeding and only accepted Parthenium. However, beetles that entered the choice test in a food-deprived state, and that encountered Xanthium first, were more likely to feed on it. Deprived beetles took longer to leave Xanthium to locate and feed on Parthenium plants in the same cage compared to satiated beetles. These experiments explain the occurrence of adult feeding on sunflower leaves in India. Sunflower is rarely accepted for feeding within host specificity choice tests, but is sometimes fed upon in no-choice feeding assays. Choice tests utilizing insects that are not responsive to plant cues may not reveal lower acceptability of less preferred non-target hosts that may be attacked when agents are in a state of high responsiveness.