

# Response to Vergara et al. (2015)—Fruiting phenology as a “triggering attribute” of invasion process: Do invasive species take advantage of seed dispersal service provided by native birds?

Diego E. Gurvich · Paula A. Tecco · Sandra Díaz

Received: 18 May 2016 / Accepted: 20 May 2016  
© Springer International Publishing Switzerland 2016

In a recent article, Vergara et al. (2015) present the results of a study aimed at testing our triggering attribute model (TA, Gurvich et al. 2005) in a woodland ecosystem in central Argentina. To that end, they compared the bird assemblage that consumes fruits of three woody species, a native tree (*Celtis ehrenbergiana*) and two congeneric invasive shrubs (*Pyracantha angustifolia* and *P. coccinea*). *C. ehrenbergiana* disperses its fruit in summer, *P. angustifolia* does so in winter, and *P. coccinea* shows some overlap in the dispersal period with the native tree [see Fig. 2 in Vergara et al. (2015)]. The authors predicted that, according to the TA approach, the diversity and abundance of frugivorous birds, and their fruit consumption, should be greater for *P. angustifolia* than for the other two species. They found no difference among the three species and conclude that the TA theory is not at play in the system. While the study provides valuable insight into the frugivorous bird assemblage, we disagree on the main conclusion, in particular regarding the logic behind the testing of the TA approach.

According to Gurvich et al. (2005), a TA is defined as a vegetative or regenerative attribute of an exotic

species that is discontinuously distributed in comparison to those of the resident community. This attribute allows the exotic species to benefit from a resource that is permanently or temporarily unused by the resident community, triggering its spread over the landscape. The winter fruit phenology of two fleshy-fruited invaders (*P. angustifolia* and *Ligustrum lucidum*) was proposed as an example of TA that would allow these two species to take advantage of a resource (bird dispersal) that resident fleshy-fruited species—whose fruits are ripe in summer and autumn—cannot tap during the winter. Therefore, the empirical prediction under the TA model is that *P. angustifolia* should show dispersal rates similar to those of the dominant fleshy-fruited resident of the invaded system. Indeed, the data provided by Vergara et al. (2015) support this prediction, showing that *P. angustifolia* has the same assemblage of bird dispersers as *C. ehrenbergiana*, but operating during a different seasonal period. Unlike what Vergara et al. (2015) have done, to test whether *P. coccinea* benefits from bird dispersal (compared to native fleshy-fruited species) would require the assessment of bird assemblages in both the coupled and uncoupled dispersal periods [see Fig. 2 in Vergara et al. (2015)]. The release from bird predators in the overlapping period is quite interesting and remains to be tested in the unfavorable (cold) season. However, we agree with the authors that dispersal would probably not be the TA that underlies the success of *P. coccinea* in the

---

D. E. Gurvich (✉) · P. A. Tecco · S. Díaz  
Instituto Multidisciplinario de Biología Vegetal  
(FCEFYN, CONICET-UNC), Av. Vélez Sarsfield 1611,  
CC495, CP5000, Córdoba, Argentina  
e-mail: degurvich@gmail.com

invaded system. In addition, the authors deal with populations of invasive species that are already quite established and abundant in the system, whereas the TA model (sensu Gurvich et al. 2005) specifically focuses on the spread stage (i.e., when abundance of the exotic species is particularly low).

In summary, while fully recognizing the value of Vergara et al.'s (2015) results in documenting and explaining present patterns of bird-plant interactions, we believe they do not reject the TA model (sensu Gurvich et al. 2005) as claimed by the authors. In the case of *P. angustifolia*, the empirical findings actually support the model. In the case of *P. coccinea*, they highlight that another attribute might be triggering

invasive success, which could be true although more research is needed to confirm this assertion.

## References

- Gurvich DE, Tecco PA, Díaz S (2005) Plant invasions in undisturbed ecosystems: the triggering attribute approach. *J Veg Sci* 16:723–728
- Vergara DL, Badini J, Peluc S (2015) Fruiting phenology as a “triggering attribute” of invasion process: Do invasive species take advantage of seed dispersal service provided by native birds? *Biol Invasions*. doi:[10.1007/s10530-015-1039-4](https://doi.org/10.1007/s10530-015-1039-4)