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Intra-guild predation (IGP) – where a top predator (IG$_{Pred}$) consumes both a basal resource and a competitor for that resource (IG$_{Prey}$) – has become a fundamental part of understanding species interactions and community dynamics.

impacts of predator choice and host quality on the interactions between predators and pathogens is currently lacking. However, there are a considerable number of studies showing the short-term impacts of predator choice and host quality on the intraguild predator fitness and associated life-history traits (e.g. predator life-span) in agricultural systems. By examining how predator behavior and life-history traits may change due to interactions with pathogens specific to the prey, we can gain greater insight into IGP community dynamics.

In general, IGP communities consist of three main death. Fecundity was the mean number of eggs produced. To quantify survival, we extracted the mean number of consumers surviving after two weeks. Finally, we defined the IG_{Pred} choice as the mean number of infected prey chosen compared to the mean number of healthy prey chosen. In addition to these means, we also collected standard deviations and sample sizes. Many studies focused on one of the above traits, however, a few studies focused on two or more. If each life-history trait was tested independently, than they were included in our meta-analysis; if they were not independent we randomly chose only one life-history trait from a single experiment.

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To standardize data reported in different scales or magnitudes, we calculated Hedges' *d* weighted average metrics using means, standard deviations, and samples sizes from each study (Rosenberg et al. 2000). Hedges' *d* incorporates overestimate-bias, working well for small sample sizes in meta-analyses (N 5). Mean effect sizes were considered small in the range from 0.2–0.4; moderate effects ranged from 0.4–0.7; strong effects ranged from 0.7–1.0 (Cohen 1992, Gaskin and Happell 2013). Any results with a mean effect size greater than 1.0 were considered very strong (Cohen 1992, Gaskin and Happell 2013).

We calculated Hedges' *d* for each study, *i*, as:

$$d_i = \frac{\overline{X}_i^E - \overline{X}_i^C}{S} J_i \qquad (1)$$

where $\overline{X}_i^E$ is the mean of the t[(Coaza7i1d5and)]TJET/PlacedGraphic BMC EMC q1 0 0 1 232.9832 401.1747 cm0 0 m7.656 0 lSQ230

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Infected prey clearly represent a poor resource regardless of infection type (Fig. 2), and predators respond to those infected prey in different ways (Fig. 3). For instance, parasitoids preferred healthy prey, while non-parasitoid, or strict, predators did not exhibit a preference for or against healthy may often be the case if the energy gain from easier to capture prey outweighs the cost of nutrient loss due to suboptimal prey (Holmes and Bethel 1972). Predators may also consume pathogen-infected prey if they are unable to identify a prey item as infected. In terms of community dynamics, predators may remove pathogens from the environment (Roy et al. 1998); however, the predator may defecate viable pathogen (Beekman 1980, Biever et al. 1982, Bruck and Lewis 2002), thus increasing the number of infected resources (Cáceres et al. 2009). The importance of the nutritional value of infected prey, the energetic consequences of consuming infected prey, and increasing or decreasing pathogen availability in the community are important topics that require further investigation (Johnson et al. 2010) and are likely to vary among predators and pathogens.

Parasitoids may be either the IG_{Pred} or the IG_{Prey} (Hochberg et al. 1990, Thomas et al. 2006). They are the IG_{Prey} when pathogens kill a parasitized host before the parasitoid can complete development (Furlong and Pell 1996, Thomas et al. 2006), and are the IG_{Pred} if they finish development in the host, thus reducing the amount of host available or even killing the pathogen (Pell et al. 7778l. (Fj91vs(191v)6p.

instance, using a predator that does not discriminate against infected prey would drive the pathogen locally extinct.

IGP theory also predicts that increased habitat complexity increases long-term stability (Janssen et al. 2007), and empirical studies support this prediction (Finke and Denno 2002, Okuyama 2008). Resources that become infected often change their movement behavior (Vasconcelos et al. 1996). As the pathogen spreads through a population, differential movement of infected and healthy individuals may set up a spatial mosaic such that certain parts of the landscape are dominated by either low or high quality prey items. This shifting mosaic may allow for long-term IGP stability on a larger spatial scale. Long-term studies investigating IGP stability in these communities will elucidate important consequences for disease dynamics.

Previous theoretical work on short-term dynamics showed that predators should readily consume parasite-infected prey if the cost of a potential infection for the predator is low and catchability of the prey is high (Lafferty 1992). However, the model assumed that infected prey were trophically-transmitted and did not differ in quality. For our study, the parasites were concomitantly consumed and are lower quality as evidenced by changes in various life-history metrics, especially for strict predators. These metrics represent proxies for what may happen under field conditions; however, they are not direct measurements of a predator's response to the environment when presented with a landscape of non-infected and infected prey. For instance, we do not have enough information on differences in overall attack rate and handling time between infected and non-infected prey (but see Jiang et al. 2011). Our results point to the need to better understand how changes in foraging strategies in the field will affect both short-term and long-term dynamics from an empirical and theoretical perspective.

We focused our attention on communities made up of crop pests and their natural enemies. Given that these communities are simplified and potentially novel systems (Altieri and Letourneau 1982, Swift and Anderson 1994), they may not reflect the complexities of other ecological systems. However, to understand how intraguild predation influences more complex communities, it is necessary to start with communities where specific interactions can be directly observed and tested. These tractable systems also represent a sub-set of natural communities or community modules (Holt and Polis 1997), which are often the focus of research in non-agricultural systems. These communities isolate predators and pathogens and may yet hold more insights for future work.

Theory and empirical evidence suggest that resource quality affects long-term stability of an intraguild predation community. Given that resource quality affects both behavioral and life-history traits of consumers, resource quality can clearly decrease the fecundity and survival of the IG_{Pred} over a short time scale, such as that of an experiment. While the long-term effects are unknown, we can speculate that the short-term impacts arising from changes in resource quality will have important consequences for system stability. Long-term experiments are still needed to better understand the impacts of resource quality on IGP dynamics.

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