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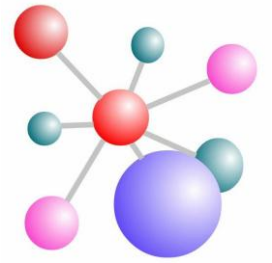
UNIVERSIDADE FEDERAL DO RIO GRANDE DO NORTE

Exame de Proficiência 2018.1

Inglês



Ciências Agrárias

Instruções

1	Confira se os dados contidos na parte inferior desta capa estão corretos e, em seguida, assine no espaço reservado para isso. Se, em qualquer outro local deste Caderno, você assinar, rubricar, escrever mensagem, etc., será excluído do Exame.
2	Este Caderno contém 5 questões discursivas referentes à Prova da Língua Estrangeira escolhida pelo candidato. Não destaque nenhuma folha.
3	Se o Caderno estiver incompleto ou contiver imperfeição gráfica que impeça a leitura, solicite imediatamente ao Fiscal que o substitua.
4	Será avaliado apenas o que estiver escrito no espaço reservado para cada resposta, razão por que os rascunhos não serão considerados.
5	Escreva de modo legível, pois dúvida gerada por grafia, sinal ou rasura implicará redução de pontos.
6	Só será permitido o uso de dicionário INGLÊS/INGLÊS.
7	A Comperve recomenda o uso de caneta esferográfica, confeccionada em material transparente, de tinta preta. Em nenhuma hipótese se avaliará resposta escrita com grafite.
8	Utilize para rascunhos, o verso de cada página deste Caderno.
9	Você dispõe de, no máximo, três horas, para responder as 5 questões que constituem a Prova.
10	Antes de retirar-se definitivamente da sala, devolva ao Fiscal este Caderno.

Assinatura do Candidato: _____

COMPERVE
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As questões de 01 a 05, cujas respostas deverão ser redigidas EM PORTUGUÊS, referem-se ao texto abaixo.

Interacting Agricultural Pests and Their Effect on Crop Yield: Application of a Bayesian Decision Theory Approach to the Joint Management of *Bromus tectorum* and *Cephus cinctus*

Ilai N. Keren, Fabian D. Menalled, David K. Weaver, James F. Robison-Cox

Encouraging positive biotic interactions, while maintaining acceptable levels of production, is implicit in the concept of integrated pest management (IPM hereafter). Yet, while IPM conceptually emphasizes the need to consider the ecological context where multiple organisms coexist, programs are often designed around a single species, usually following a preemptive approach where decision such as cultivar type and seeding rate are made prior to the detection of the pest. This single-pest management approach may not provide satisfactory solutions when confronted with the dynamic and complex interactions occurring between multiple pests at the same or different trophic levels. Replacement of the current single-species pest management paradigm with more sophisticated, biologically-based programs requires an understanding of the direct and indirect interactions occurring between the crop and all categories of pests in the IPM decision-making process.

In the Northern Great Plains, the landscape homogeneity and high commodity specialization of conventional agriculture within the native shortgrass prairie ecosystem that dominates this region has resulted in large monocultures of wheat (*Triticum aestivum L.*), an associated specialized pest complex, and an increased reliance on off-farm synthetic inputs. Two key members of this pest complex include *Bromus tectorum L.* (downy brome, cheatgrass) and *Cephus cinctus Norton* (Hymenoptera: Cephidae) (wheat stem sawfly). Despite their ubiquity, interactions, and impacts, no formal attempt has been made to address their joint management. Furthermore, to our knowledge, no attempt has been made to develop a modeling framework that considers multi-pest management decisions while taking into account direct and indirect interactions among species belonging to same or different trophic levels. The *B. tectorum*—*C. cinctus*—wheat complex represents an ideal case study to assess approaches to integrate direct and indirect multi-trophic interactions into the management decision process.

Adoption of ecologically-based pest management requires increased understanding of the direct and indirect interactions occurring among pests belonging to the same or different trophic levels. In this paper, we assessed a formal framework for evaluating outcomes of commonly used crop management practices to reflect a total-system approach to pest management that target species at two trophic levels. Specifically, we used a Bayesian decision theoretic approach in combination with path analysis to probabilistically model wheat grain yield while accounting for how crop variety, crop seeding rate, and herbicide application rate jointly affect *B. tectorum* as well as *C. cinctus* abundance and impact. This approach allowed us to jointly incorporate direct and indirect biological interactions occurring within the agroecosystem in a predictive model of wheat yield, rather than just evaluating the individual effect of each pest- or crop-management tactic. To meet our objective, we developed our model based on empirical data of naturally occurring pest levels and wheat yield observed in a field experiment where the crop was grown under different management scenarios.

This study demonstrated that, even in the relatively low diversity agricultural system that dominates the Northern Great Plains, interactions between pest groups belonging to different trophic levels could complicate the outcome of otherwise seemingly simple management decisions. Our experiment, analysis, and results are consistent with applying a systems approach to modeling. Specifically, we developed hypotheses of causal relationships from key structural and functional aspects of the system which allowed us, in turn, to generalize relevant system dynamics and represent them in a simple manner consistent with management goals. Thus, this

study indicates that *B. tectorum* acts as a strong ecological sink for *C. cinctus*. Furthermore, the joint evaluation of *C. cinctus* infestation rates and grain yield reductions in the presence of B. tectorum revealed new insights into *C. cinctus* oviposition behavior. Specifically, our results indicated that at lower seeding rates and greater B. tectorum pressure, *C. cinctus* seemed to compromise offspring-performance by ovipositing in significantly lower yielding stems and maintaining a relatively constant level of infestation in the crop. Future manipulative studies should quantify changes in oviposition behavior as a function of wheat and *B. tectorum* relative abundance to improve model precision.

Disponível em:<https://doi.org/10.1371/journal>. Acesso em: 28 mar.2018. [Adaptado].

Questão 1

Pesquisas teóricas ou empíricas buscam preencher lacunas deixadas por pesquisas anteriores. Discorra sobre as lacunas de pesquisa que levaram os autores a desenvolver este estudo.

Espaço para Resposta

Questão 2

Descreva qual a relação, segundo o texto, entre o conceito de *IPM* e os atuais programas de gestão de pragas e explique o que levou a região das Grandes Planícies a desenvolver grandes monoculturas de *Triticum aestivum L*.

Espaço para Resposta

Questão 3

Explicite a abordagem teórico-metodológica utilizada pelos autores para a incorporação de interações biológicas em um modelo de colheita de trigo.

Espaço para Resposta

Questão 4

Resuma os resultados que os autores obtiveram no que tange à relação entre *B. tectorum* e *C. cinctus*.

Espaço para Resposta

Questão 5

- Traduza o fragmento textual abaixo no espaço reservado para isso.
- Seu texto deverá apresentar clareza e estar bem articulado tanto em termos estruturais quanto de sentido.

> *This single-pest management approach may not provide satisfactory solutions when confronted with the dynamic and complex interactions occurring between multiple pests at the same or different trophic levels. Replacement of the current single-species pest management paradigm with more sophisticated, biologically-based programs requires an understanding of the direct and indirect interactions occurring between the crop and all categories of pests in the IPM decision-making process.*

ESPAÇO DESTINADO AO TEXTO DEFINITIVO