



Ecosphere Ecology Ecological Monographs Ecological Applications Frontiers Bulletin Ecological Archives

ESA Publications Home Online Journals Home EcoTrack Subscriptions

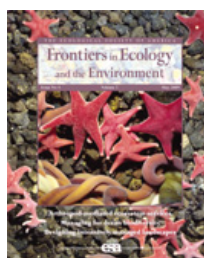
Quick Search

All Publications > Frontiers in Ecology and the Environment > May 2009 > Maximizing arthropod-mediated ecosystem services in agricultural lands...

Advanced Search

Volume 7, Issue 4 (May)

< Previous Next >



[Current Issue](#)
[Available Issues](#)
[e-View](#)

Share this Article

[Share](#) |

Journal Information

ISSN: 1540-9295
Frequency: 10 times per year

[General Information](#)

[Staff](#)

[Instructions to Authors](#)

[Manuscript Submission](#)

[How to Subscribe](#)

[Permissions](#)

< [Previous Article](#)

Volume 7, Issue 4 (May 2009)

[Next Article](#) >

[Add to Favorites](#)

| [Email](#)

| [Download to Citation Manager](#)

| [Track Citations](#)

| [Permissions](#)

[Full-text](#)

[PDF](#)

Rufus Isaacs, Julianna Tuell, Anna Fiedler, Mary Gardiner, and Doug Landis. 2009. Maximizing arthropod-mediated ecosystem services in agricultural landscapes: the role of native plants. *Frontiers in Ecology and the Environment* 7: 196–203.
<http://dx.doi.org/10.1890/080035>

Reviews

Maximizing arthropod-mediated ecosystem services in agricultural landscapes: the role of native plants

Rufus Isaacs*, Julianna Tuell, Anna Fiedler, Mary Gardiner, and Doug Landis

Beneficial arthropods, including native bees, predators, and parasitoids, provide valuable ecosystem services worth \$8 billion to US agriculture each year. These arthropod-mediated ecosystem services (AMES) include crop pollination and pest control, which help to maintain agricultural productivity and reduce the need for pesticide inputs. Maximizing survival and reproduction of beneficial arthropods requires provision of pollen and nectar resources that are often scarce in modern agricultural landscapes. Increasingly, native plants are being evaluated for this purpose. Native plants can outperform recommended non-natives and also provide local adaptation, habitat permanency, and support of native biodiversity. We predict that the success of insect conservation programs using flowering plants to increase AMES on farmland will depend on landscape context, with the greatest success in landscapes of moderate complexity. Reintegration of native plants into agricultural landscapes has the potential to support multiple conservation goals, and will require the collaboration of researchers, conservation educators, and native plant experts.

Department of Entomology, Michigan State University, East Lansing, MI

* (E-mail: isaacsr@msu.edu)

Cited by

Mary M. Gardiner, Scott P. Prajzner, Caitlin E. Burkman, Sandra Albro, Parwinder S. Grewal. (2013) Vacant land conversion to community gardens: influences on generalist arthropod predators and biocontrol services in urban greenspaces. *Urban Ecosystems*
Online publication date: 28-Mar-2013.
[CrossRef](#)

F.J.J.A. Bianchi, V. Mikos, L. Brussaard, B. Delbaere, M.M. Pulleman. (2013) Opportunities and limitations for functional agrobiodiversity in the European context. *Environmental Science & Policy* 27, 223-231
Online publication date: 1-Mar-2013.
[CrossRef](#)

Wilton P. Cruz, Renato A. Sarmiento, Adenir V. Teodoro, Marçal P. Neto, Máira Ignacio. (2013) Driving factors of the communities of phytophagous and predatory mites in a physic nut plantation and spontaneous plants associated. *Experimental and Applied Acarology*
Online publication date: 17-Feb-2013.
[CrossRef](#)

Ashley B. Bennett, Claudio Gratton. (2013) Floral diversity increases beneficial arthropod richness and decreases variability in arthropod community composition. *Ecological Applications* 23:1, 86-95
Online publication date: 1-Jan-2013.
[Abstract](#) · [Full Text](#) · [PDF \(1308 KB\)](#)

Bruce A. Robertson, Patrick J. Doran. 2013. Biofuels and Biodiversity: The Implications of Energy Sprawl. , 528-539.
[CrossRef](#)

Chelse M. Prather, Shannon L. Pelini, Angela Laws, Emily Rivest, Megan Woltz, Christopher P. Bloch, Israel Del Toro, Chuan-Kai Ho, John Kominoski, T. A. Scott Newbold, Sheena Parsons, A. Joern. (2012) Invertebrates, ecosystem services and climate change. *Biological Reviews* a-n/a
Online publication date: 1-Dec-2012.
[CrossRef](#)

Kris A.G. Wyckhuys, Yanhui Lu, Helda Morales, Luis L. Vazquez, Jesusa C. Legaspi, Panagiotis A. Eliopoulos, Luis M. Hernandez. (2012) Current status and potential of conservation biological control for agriculture in the developing world. *Biological Control*
Online publication date: 1-Dec-2012.
[CrossRef](#)

BRETT R. BLAAUW, RUFUS ISAACS. (2012) Larger wildflower plantings increase natural enemy density, diversity, and biological control of sentinel prey, without increasing herbivore density. *Ecological Entomology* 37:5, 386-394
Online publication date: 1-Oct-2012.
[CrossRef](#)

- A. B. Bennett, C. Gratton. (2012) Measuring Natural Pest Suppression at Different Spatial Scales Affects the Importance of Local Variables. *Environmental Entomology* **41**:5, 1077-1085
Online publication date: 1-Oct-2012.
[CrossRef](#)
- Thomas R. Unruh, Robert S. Pfannenstiel, Catharine Peters, Jay F. Brunner, Vincent P. Jones. (2012) Parasitism of leafrollers in Washington fruit orchards is enhanced by perimeter plantings of rose and strawberry. *Biological Control* **62**:3, 162-172
Online publication date: 1-Sep-2012.
[CrossRef](#)
- L. Zumoffen, C. Salto, A. Salvo. (2012) Preliminary study on parasitism of aphids (Hemiptera: Aphididae) in relation to characteristics of alfalfa fields (*Medicago sativa* L.) in the Argentine Pampas. *Agriculture, Ecosystems & Environment* **159**, 49-54
Online publication date: 1-Sep-2012.
[CrossRef](#)
- Stephen D. Wratten, Mark Gillespie, Axel Decourtye, Eric Mader, Nicolas Desneux. (2012) Pollinator habitat enhancement: Benefits to other ecosystem services. *Agriculture, Ecosystems & Environment* **159**, 112-122
Online publication date: 1-Sep-2012.
[CrossRef](#)
- Teja Tschamtko, Jason M. Tylianakis, Tatyana A. Rand, Raphael K. Didham, Lenore Fahrig, Péter Batáry, Janne Bengtsson, Yann Clough, Thomas O. Crist, Carsten F. Dormann, Robert M. Ewers, Jochen Fründ, Robert D. Holt, Andrea Holzschuh, Alexandra M. Klein, David Kleijn, Claire Kremen, Doug A. Landis, William Laurance, David Lindenmayer, Christoph Scherber, Navjot Sodhi, Ingolf Steffan-Dewenter, Carsten Thies, Wim H. van der Putten, Catrin Westphal. (2012) Landscape moderation of biodiversity patterns and processes - eight hypotheses. *Biological Reviews* **87**:3, 661-685
Online publication date: 1-Aug-2012.
[CrossRef](#)
- Deborah K. Letourneau. 2012. Integrated Pest Management - Outbreaks Prevented, Delayed, or Facilitated?. , 371-394.
[CrossRef](#)
- Terry Harrison, May R. Berenbaum. (2012) Moth diversity in three biofuel crops and native prairie in Illinois. *Insect Scienceno-no*
Online publication date: 1-Jul-2012.
[CrossRef](#)
- Sagrario Gámez-Virués, Mattias Jonsson, Barbara Ekbohm. 2012. The Ecology and Utility of Local and Landscape Scale Effects in Pest Management. , 106-120.
[CrossRef](#)
- Douglas A. Landis, Mary M. Gardiner, Jean Tompkins. 2012. Using Native Plant Species to Diversify Agriculture. , 276-292.
[CrossRef](#)
- J. Franklin Egan, David A. Mortensen. (2012) A comparison of land-sharing and land-sparing strategies for plant richness conservation in agricultural landscapes. *Ecological Applications* **22**:2, 459-471
Online publication date: 1-Mar-2012.
[Abstract](#) . [Full Text](#) . [PDF \(372 KB\)](#)
- Shoki Al-Dobai, Stuart Reitz, John Sivinski. (2012) Tachinidae (Diptera) associated with flowering plants: Estimating floral attractiveness. *Biological Control*
Online publication date: 1-Feb-2012.
[CrossRef](#)
- J. Franklin Egan, David A. Mortensen. (2012) Quantifying vapor drift of dicamba herbicides applied to soybean. *Environmental Toxicology and Chemistry*n/a-n/a
Online publication date: 1-Jan-2012.
[CrossRef](#)
- Bruce A. Robertson, Cody Porter, Douglas A. Landis, Douglas W. Schemske. (2011) Agroenergy Crops Influence the Diversity, Biomass, and Guild Structure of Terrestrial Arthropod Communities. *BioEnergy Research*
Online publication date: 5-Nov-2011.
[CrossRef](#)
- Priyanka Yadav, Kathy Duckworth, Parwinder S. Grewal. (2011) Habitat structure influences below ground biocontrol services: A comparison between urban gardens and vacant lots. *Landscape and Urban Planning*
Online publication date: 1-Nov-2011.
[CrossRef](#)
- Nathaniel J. Walton, Rufus Isaacs. (2011) Survival of Three Commercially Available Natural Enemies Exposed to Michigan Wildflowers. *Environmental Entomology* **40**:5, 1177-1182
Online publication date: 1-Oct-2011.
[CrossRef](#)
- Ashley B. Bennett, Claudio Gratton. (2011) Local and landscape scale variables impact parasitoid assemblages across an urbanization gradient. *Landscape and Urban Planning*
Online publication date: 1-Oct-2011.
[CrossRef](#)
- Mark C. Myers, Benjamin J. Hokschi, James T. Mason. (2011) Butterfly response to floral resources during early establishment at a heterogeneous prairie biomass production site in Iowa, USA. *Journal of Insect Conservation*
Online publication date: 1-Sep-2011.
[CrossRef](#)
- C. Carvell, J. L. Osborne, A. F. G. Bourke, S. N. Freeman, R. F. Pywell, M. S. Heard. (2011) Bumble bee species' responses to a targeted conservation measure depend on landscape context and habitat quality. *Ecological Applications* **21**:5, 1760-1771
Online publication date: 1-Jul-2011.
[Abstract](#) . [Full Text](#) . [PDF \(317 KB\)](#)
- P. Batáry, A. Baldi, D. Kleijn, T. Tschamtko. (2011) Landscape-moderated biodiversity effects of agri-environmental management: a meta-analysis. *Proceedings of the Royal Society B: Biological Sciences* **278**:1713, 1894-1902
Online publication date: 22-Jun-2011.
[CrossRef](#)
- Nathaniel J. Walton, Rufus Isaacs. (2011) Influence of Native Flowering Plant Strips on Natural Enemies and Herbivores in Adjacent Blueberry Fields. *Environmental Entomology* **40**:3, 697-705
Online publication date: 1-Jun-2011.
[CrossRef](#)
- Eeva-Liisa Alanen, Terho Hyvönen, Sami Lindgren, Oskari Härmä, Mikko Kuussaari. (2011) Differential responses of bumblebees and diurnal Lepidoptera to vegetation succession in long-term set-aside. *Journal of Applied Ecology*n-no
Online publication date: 1-Jun-2011.
[CrossRef](#)
- John Sivinski, David Wahl, Tim Holler, Shoki Al Dobai, Robert Sivinski. (2011) Conserving Natural Enemies with Flowering Plants:

- Estimating Floral Attractiveness to Parasitic Hymenoptera and Attraction's Relationship to Flower and Plant Morphology. *Biological Control*
Online publication date: 1-May-2011.
[CrossRef](#)
- François-Régis Goebel, Nader Sallam. (2011) New pest threats for sugarcane in the new bioeconomy and how to manage them. *Current Opinion in Environmental Sustainability* 3:1-2, 81-89
Online publication date: 1-Mar-2011.
[CrossRef](#)
- Teja Tscharnkte, Péter Batáry, Carsten F. Dormann. (2011) Set-aside management: How do succession, sowing patterns and landscape context affect biodiversity?. *Agriculture, Ecosystems & Environment*
Online publication date: 9-Feb-2011.
[CrossRef](#)
- Nick M. Haddad, Gregory M. Crutsinger, Kevin Gross, John Haarstad, David Tilman. (2011) Plant diversity and the stability of foodwebs. *Ecology Letters* 14:1, 42-46
Online publication date: 1-Jan-2011.
[CrossRef](#)
- Luisa Gigante Carvalheiro, Ruan Veldtman, Awraris Getachew Shenkute, Gebreamlak Bezabih Tesfay, Christian Walter Werner Pirk, John Sydney Donaldson, Susan Wendy Nicolson. (2011) Natural and within-farmland biodiversity enhances crop productivity. *Ecology Letters* no-no
Online publication date: 1-Jan-2011.
[CrossRef](#)
2011. Bibliography. , 525-606.
[CrossRef](#)
- Dave Goulson, Olivier Lepais, Stephanie O'Connor, Juliet L. Osborne, Roy A. Sanderson, John Cussans, Louis Goffe, Ben Darvill. (2010) Effects of land use at a landscape scale on bumblebee nest density and survival. *Journal of Applied Ecology* 47:6, 1207-1215
Online publication date: 1-Dec-2010.
[CrossRef](#)
- Mattias Jonsson, Steve D. Wratten, Doug A. Landis, Jean-Marie L. Tompkins, Ross Cullen. (2010) Habitat manipulation to mitigate the impacts of invasive arthropod pests. *Biological Invasions* 12:9, 2933-2945
Online publication date: 1-Sep-2010.
[CrossRef](#)
- CHEE-SENG CHONG, ARY A. HOFFMANN, LINDA J. THOMSON. (2010) Local-scale spatial dynamics of ants in a temperate agroecosystem. *Austral Ecology* no-no
Online publication date: 1-Jul-2010.
[CrossRef](#)
- Eveliëne G. Steingröver, Willemien Geertsema, Walter K. R. E. Wingerden. (2010) Designing agricultural landscapes for natural pest control: a transdisciplinary approach in the Hoeksche Waard (The Netherlands). *Landscape Ecology* 25:6, 825-838
Online publication date: 1-Jul-2010.
[CrossRef](#)
- Brian Hogg, Kent Daane. Ecosystem services in the face of invasion: the persistence of native and non-native spiders in an agricultural landscape. *Ecological Applications* 0:0,
[Abstract](#) . [PDF \(2315 KB\)](#)
- Michael J. Furlong, Myron P. Zalucki. (2010) Exploiting predators for pest management: the need for sound ecological assessment. *Entomologia Experimentalis et Applicata* 135:3, 225-236
Online publication date: 1-Jun-2010.
[CrossRef](#)
- Douglas A. Landis, Benjamin P. Werling. (2010) Arthropods and biofuel production systems in North America. *Insect Science* 17:3, 220-236
Online publication date: 1-Jun-2010.
[CrossRef](#)
- Christopher R Webster, David J Flaspohler, Randall D Jackson, Timothy D Meehan, Claudio Gratton. (2010) Diversity, productivity and landscape-level effects in North American grasslands managed for biomass production. *Biofuels* 1:3, 451-461
Online publication date: 1-May-2010.
[CrossRef](#)
- Mary A. Gardiner, Julianna K. Tuell, Rufus Isaacs, Jason Gibbs, John S. Ascher, Douglas A. Landis. (2010) Implications of Three Biofuel Crops for Beneficial Arthropods in Agricultural Landscapes. *BioEnergy Research* 3:1, 6-19
Online publication date: 1-Mar-2010.
[CrossRef](#)
- Sandrine Petit, Aline Boursault, Mélanie Le Guilloux, Nicolas Munier-Jolain, Xavier Reboud. (2010) Weeds in agricultural landscapes. A review. *Agronomy for Sustainable Development*
Online publication date: 1-Jan-2010.
[CrossRef](#)
- Nick M. Haddad, Gregory M. Crutsinger, Kevin Gross, John Haarstad, Johannes M.H. Knops, David Tilman. (2009) Plant species loss decreases arthropod diversity and shifts trophic structure. *Ecology Letters* 12:10, 1029-1039
Online publication date: 1-Oct-2009.
[CrossRef](#)
- Martin H. Schmidt-Entling, Jolanda Döbeli. (2009) Sown wildflower areas to enhance spiders in arable fields. *Agriculture, Ecosystems & Environment* 133:1-2, 19-22
Online publication date: 1-Sep-2009.
[CrossRef](#)
- D. A. Landis, M. M. Gardiner, W. van der Werf, S. M. Swinton. (2008) Increasing corn for biofuel production reduces biocontrol services in agricultural landscapes. *Proceedings of the National Academy of Sciences* 105:51, 20552-20557
Online publication date: 22-Dec-2008.
[CrossRef](#)

