

## Diversity of small terrestrial mammals under different organic farming managements in Mediterranean and Continental agriculture ecosystems

Michaela Kalivodová, Róbert Kanka, Artemi Cerda

### References

- Adebron, C. et al. (2020). Soil organic matter links organic farming to enhanced predator evenness. *Biological Control*, 146, 104278. <https://doi.org/10.1016/j.biocontrol.2020.104278>
- Balčiauskas, L., Balčiauskienė, L. & Stirė, V. (2019). Mow the grass at the mouse's peril: Diversity of small mammals in commercial fruit farms. *Animals*, 9(6), 334. <https://doi.org/10.3390/ani9060334>
- Bates, F. S. & Harris, S. (2009). Does hedgerow management on organic farms benefit small mammal populations? *Agriculture, Ecosystems and Environment*, 129, 124–130. <https://doi.org/10.1016/j.agee.2008.08.002>
- Bengtsson, J., Ahnström, J. & Weibull A. (2005). The effects of organic agriculture on biodiversity and abundance: a meta-analysis. *Journal of Applied Ecology*, 4, 261–269. <https://doi.org/10.1111/j.1365-2664.2005.01005.x>
- Benton, T. G., Vickery, J. A. & Wilson J. D. (2003). Farmland biodiversity: is habitat heterogeneity the key? *Trends in Ecology and Evolution*, 18 (4), 182–188. [https://doi.org/10.1016/S0169-5347\(03\)00011-9](https://doi.org/10.1016/S0169-5347(03)00011-9)
- Bertolino, S. et al. (2015). Environmental factors and agronomic practices associated with Savi's pine vole abundance in Italian apple orchards. *Journal of Pest Science*, 88, 135–142. <https://doi.org/10.1007/s10340-014-0581-7>
- Brussaard, L., De Ruiter, P.C., Brown, G.G. (2007). Soil biodiversity for agricultural sustainability. *Agriculture Ecosystems & Environment*, 121, 233–244. <https://doi.org/10.1016/j.agee.2006.12.013>
- Cerdà, A. Et al. (2020). Tillage versus no-tillage. Soil properties and hydrology in an organic persimmon farm in eastern Iberian Peninsula. *Water*, 12(6), 1539. <https://doi.org/10.3390/w12061539>
- Coda, J. et al. (2015). Small mammals in farmlands of Argentina: Response to organic and conventional farming. *Agriculture, Ecosystems and Environment*, 211, 17–23. <https://doi.org/10.1016/j.agee.2015.05.007>
- Coda, J. et al. (2016). The use of fluctuating asymmetry as a measure of farming practice effects in rodents: A species-specific response. *Biological indicators*, 70, 269–275. <https://doi.org/10.1016/j.ecolind.2016.06.018>
- Chaiyarat, R., Sripho, S. & Ardsungnoen, S. (2020). Small mammal diversity in agroforestry area and other plantations of Doi Tung Development Project, Thailand. *Agroforest Syst.* <https://doi.org/10.1007/s10457-020-00529-y>
- Csanády, A., Mošanský, L. & Stanko, M. (2018). Craniometric comparison and discrimination of two sibling species of the genus *Mus* (Mammalia, Rodentia) from Slovakia. *Journal of Vertebrate Biology*, 67(3-4), 158–164. <https://doi.org/10.25225/fozo.v67.i3-4.a2.2018>
- Daba, M. H. & Dejene, S. W. (2018). The role of biodiversity and ecosystem services in carbon sequestration and its implication for climate change mitigation. *Environmental Sciences and Natural Resources*, 11(2), 1-10. <http://dx.doi.org/10.19080/IJESNR.2018.11.555810>
- Diacono, M. Et al. (2016). Combined agro-ecological strategies for adaptation of organic horticultural systems to climate change in Mediterranean environment. *Italian Journal of Agronomy*, 11 (2), 85–91. <https://doi.org/10.4081/ija.2016.730>
- Fisher, C., Thies, C. & Tschardtke, T. (2011). Small mammals in agricultural landscapes: Opposing responses to farming practices and landscape complexity. *Biological Conservation*, 144, 1130–1136. <https://doi.org/10.1016/j.biocon.2010.12.032>
- Fisher, C. et al. (2018). Ecosystem services and disservices provided by small rodents in arable fields: Effects of local and landscape management. *Journal of Applied Ecology*, 55, 548–558. <https://doi.org/10.1111/1365-2664.13016>
- Gerasimov, S. et al. (1990). Morphometric stepwise discriminant analysis of the five genetically determined European taxa of the genus *Mus*. *Biological Journal of the Linnean Society*, 41 (1-3), 47–64. <https://doi.org/10.1111/j.1095-8312.1990.tb00820.x>
- Gomez, M. D. et al. (2017). Small mammal in agroecosystems: Response to land use intensity and farming management. *Mastozoología Neotropical*, 24 (2), 289–300. Retrieved June 18, 2020 from <http://www.scielo.org.ar/pdf/mznt/v24n2/v24n2a04.pdf>

- Gomez, M. D. et al. (2018). Small mammal responses to farming practices in central Argentinian agroecosystems: The use of hierarchical occupancy models. *Austral Ecology*, 43, 828–838. <https://doi.org/10.1111/aec.12625>
- Guadie, M. et al. (2020). Effects of soil bund and stone-faced soil bund on soil physicochemical properties and crop yield under rain-fed conditions of Northwest Ethiopia. *Land*, 9(1), 13. <https://doi.org/10.3390/land9010013>
- Han, H. et al. (2020). Abundance and diversity of denitrifying bacterial communities associated with N<sub>2</sub>O emission under long-term organic farming. *European Journal of Soil Biology*, 97, 103153. <https://doi.org/10.1016/j.ejsobi.2020.103153>
- Hole, D. G. et al. (2005). Does organic farming benefit biodiversity? *Biological Conservation*, 122, 113–130. <https://doi.org/10.1016/j.biocon.2004.07.018>
- Holland, J. M. (2004). The environmental consequences of adopting conservation tillage in Europe: reviewing the evidence. *Agriculture, Ecosystems and Environment*, 103, 1–25. <https://doi.org/10.1016/j.agee.2003.12.018>
- Jensen, T. S., Hansen, T. S. & Olsen K. (2010). Organic farms as refuges for small mammal biodiversity in agroecosystems. *Organic eprints*, 19072. Retrieved July 7, 2020 from <https://orprints.org/19072/>
- Kalesný, F. (1972). Arbeitsgeräte der Weinbauer in der Slowakei. *Univ. Comeniana Bratislavensis Facultas Philosophica Ethnologica Slavica*, 4, 90–91.
- Keesstra, S. D. et al. (2019). Straw mulch as a sustainable solution to decrease runoff and erosion in glyphosate-treated clementine plantations in Eastern Spain. An assessment using rainfall simulation experiments. *Catena*, 174, 95–103. <https://doi.org/10.1016/j.catena.2018.11.007>
- Khenzykhenova, F. I. (1996). Late Pleistocene small mammals from the Baikal region (Russia). *Acta zoologica cracoviensia*, 39(1), 229–234. Retrieved July 12, 2020 from [http://www.isez.pan.krakow.pl/journals/azc/pdf/azc\\_v/39\(1\)/39\(1\)\\_23.pdf](http://www.isez.pan.krakow.pl/journals/azc/pdf/azc_v/39(1)/39(1)_23.pdf)
- López-Vicente, M. et al. (2020). Effectiveness of cover crops to reduce loss of soil organic matter in a rainfed vineyard. *Land*, 9 (7), 230. <https://doi.org/10.3390/land9070230>
- Marco, Y. C. et al. (2019). Climate, environment and human behaviour in the Middle Palaeolithic of Abrigo de la Quebrada (Valencia, Spain): The evidence from charred plant and micromammal remains. *Quaternary Science Reviews*, 217, 152–168. <https://doi.org/10.1016/j.quascirev.2018.11.032>
- Novara, A. et al. (2019). The effect of shallow tillage on soil erosion in a semi-arid vineyard. *Agronomy*, 9(5), 257. <https://doi.org/10.3390/agronomy9050257>
- Obiora, C. J. & Madukwe, M. C. (2011). Climate Change Mitigation: The Role of Agriculture. *Journal of Agricultural Extension*, 15(1). <http://dx.doi.org/10.4314/jae.v15i1.6>
- Oehl, F. et al. (2004). Impact of long-term conventional and organic farming on the diversity of arbuscular mycorrhizal fungi. *Oecologia*, 138(4), 574–583. <https://doi.org/10.1007/s00442-003-1458-2>
- AMANULLAH, DR & Brajendra, P. (2017). THREATS TO SOILS: GLOBAL TRENDS AND PERSPECTIVES. *Global Land Outlook*.
- Rick, T. C. et al. (2013). Archeology, deep history, and the human transformation of island ecosystems. *Anthropocene*, 4, 33–45. <https://doi.org/10.1016/j.ancene.2013.08.002>
- Riojas-López, M. E., Mellink, E. & Luévano, J. (2018). A semiarid fruit agroecosystem as a conservation-friendly option for small mammals in an anthropized landscape in Mexico. *Ecological Applications*, 28(2), 495–507. <https://doi.org/10.1002/eap.1663>
- Rodrigo-Comino, J. et al. (2020). The potential of straw mulch as a nature-based solution for soil erosion in olive plantation treated with glyphosate: A biophysical and socioeconomic assessment. *Land Degradation & Development*, 31, 1877–1889. <https://doi.org/10.1002/ldr.3305>
- Rodrigo-Comino, J., Keesstra, S., & Cerdà, A. (2018). Soil erosion as an environmental concern in vineyards: The case study of Celler del Roure, Eastern Spain, by means of rainfall simulation experiments. *Beverages*, 4(2), 31. <https://doi.org/10.3390/beverages4020031>
- Rollan, A., Hernández-Matías, A. & Real, J. (2019). Organic farming favours bird communities and their resilience to climate change in Mediterranean vineyards. *Agriculture, Ecosystems and Environment*, 269, 107–115. <https://doi.org/10.1016/j.agee.2018.09.029>
- Rosati, A., Borek, R., Canali, S. (2020). Agroforestry and organic agriculture. *Agroforestry Systems*. <https://doi.org/10.1007/s10457-020-00559-6>
- Pierzynski, G., & Brajendra, P. (eds). (2017). *Threats to soils: Global trends and perspectives. A Contribution from the Intergovernmental Technical Panel on Soils, Global Soil Partnership Food and Agriculture Organization of the United Nations*. Global Land Outlook Working Paper. Retrieved November 20, 2020 from [https://knowledge.unccd.int/sites/default/files/2018-06/17.%20Threats%2Bto%2BSoils\\_\\_Pierzynski\\_Brajendra.pdf](https://knowledge.unccd.int/sites/default/files/2018-06/17.%20Threats%2Bto%2BSoils__Pierzynski_Brajendra.pdf)

- Sandhu, H. S., Wratten S. D. & Cullen R. (2010). The role of supporting ecosystem services in conventional and organic arable farmland. *Ecological Complexity*, 7(3), 302–310. <https://doi.org/10.1016/j.ecocom.2010.04.006>
- Sannigrahi, S. et al. (2019). Ecosystem service value assessment of a natural reserve region for strengthening protection and conservation. *Journal of Environmental Management*, 244, 208–227. <https://doi.org/10.1016/j.jenvman.2019.04.095>
- Schlötelburg, A. e al. (2019). Self-service traps inspected by avian and terrestrial predators as a management option for rodents. *Pest Management science*, 76, 103–110. <https://doi.org/10.1002/ps.5550>
- Serafini, N. V. et al. (2019). The landscape complexity relevance to farming effect assessment on small mammal occupancy in Argentinian farmlands. *Oecologia*, 191, 995–1002. <https://doi.org/10.1007/s00442-019-04545-3>
- StatSoft, Inc. (2013). STATISTICA (data analysis software system), version 12. [www.statsoft.com](http://www.statsoft.com)
- Suchomel, J. et al. (2019). Impact of *Microtus arvalis* and *Lepus europaeus* on apple trees by trunk bark gnawing. *Plant Protection Science*, 55 (2), 142–147. <https://doi.org/10.17221/64/2018-PPS>
- Sullivan, T., P. & Sullivan, D. S. (2018). Creation of bunchgrass, sagebrush, and perennial grassland habitats within a semi-arid agricultural setting: Implications for small mammals. *Journal of Arid Environments*, 156, 50–58. <https://doi.org/10.1016/j.jaridenv.2018.04.004>
- Sullivan, T. P., Sullivan, D. S. & Thistlewoodc, H. M. A (2012). Abundance and diversity of small mammals in response to various linear habitats in semi-arid agricultural landscapes. *Journal of Arid Environments*, 83, 54–61. <https://doi.org/10.1016/j.jaridenv.2012.03.003>
- Šálek, M. et al. (2018). Bringing diversity back to agriculture: Smaller fields and non-crop elements enhance biodiversity in intensively managed arable farmlands. *Ecological Indicators*, 90, 65–73. <https://doi.org/10.1016/j.ecolind.2018.03.001>
- Walmsley, A. & Cerdà, A. (2017). Soil macrofauna and organic matter in irrigated orchards under Mediterranean climate. *Biological Agriculture & Horticulture*, 33(4), 247–257. <https://doi.org/10.1080/01448765.2017.1336486>
- Wolka, K. et al. (2021). Soil organic carbon and associated soil properties in Enset (*Ensete ventricosum* Welw. Cheesman)-based homegardens in Ethiopia. *Soil and Tillage Research*, 205, 104791. <https://doi.org/10.1016/j.still.2020.104791>
- Yin, R. et al. (2020). Soil functional biodiversity and biological quality under threat: Intensive land use outweighs climate change. *Soil Biology and Biochemistry*, 147, 107847. <https://doi.org/10.1016/j.soilbio.2020.107847>