

Green and animal manure use in organic field crop systems

Abstract

Dual-use cover/green manure (CGM) crops and animal manure are used to supply nitrogen (N) and phosphorus (P) to organically grown field crops. A comprehensive review of previous research was conducted to identify how CGM crops and animal manure have been used to meet N and P needs of organic field crops, and to identify knowledge gaps to direct future research efforts. Results indicate that: (a) CGM crops are used to provide N to subsequent cash crops in rotations; (b) CGM-supplied N generally can meet field crop needs in warm, humid regions but is insufficient for organic grain crops grown in cool and sub-humid regions; (c) adoption of conservation tillage practices can create or exacerbate N deficiencies; (d) excess N and P can result where animal manures are accessible if application rates are not carefully managed; and (e) integrating animal grazing into organic field crop systems has potential benefits but is generally not practiced. Work is needed to better understand the mechanisms governing the release of N by CGM crops to subsequent cash crops, and the legacy effects of animal manure applications in cool and sub-humid regions. The benefits and synergies that can occur by combining targeted animal grazing and CGMs on soil N, P, and other nutrients should be investigated. Improved communication and networking among researchers can aid efforts to solve soil fertility challenges faced by organic farmers when growing field crops in North America and elsewhere.

Carr, P. M., M.A. Cavigelli, H. Darby, K. Delate, J.O. Eberly, H.K. Fryer, G.G. Gramig, J. R. Heckman, E.B. Mallory, J.R. Reeve, E.M. Silva, D.H. Suchoff, and A.L. Woodley. 2019. Green and animal manure use in organic field crop systems, *Agron. J.O.* doi:10.1002/agj2.20082