Working for organic farming in Europe

International Federation of Organic Agriculture Movements – EU Regional Group

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European Commission
DIRECTORATE-GENERAL
ENVIRONMENT
Directorate B - Nature
ENV.B.2 – Biodiversity
Head of Unit
Copy to: Claudia Olazabal

RE: Stakeholder consultation – post-2010 biodiversity strategy

Dear Mr. Wakenhut,

Thank you very much for the opportunity to contribute to the EU Biodiversity discussion and the biodiversity strategy beyond 2010. IFOAM EU Group would hereby like to comment on the outline presented at the stakeholder meeting on 3 June.

a) General comments

IFOAM EU Group thinks that the targeted approach is appropriate, and that the six sub-targets are generally heading towards the right direction. However, we would like to make some relevant comments:

- **Climate change:** The COM background document suggests that the strategy will not include climate change as an extra sub-target as it is already placed in a different EU strategy. Whilst this is true, it is important that the biodiversity strategy at least outline the importance of the link between biodiversity protection and climate change mitigation in order to avoid that one strategy operates at the expense of the other. Furthermore, the biodiversity strategy should claim biodiversity as a cross-cutting issue to be considered in all legislation.

- **Communication/knowledge**: The communication of what the loss of biodiversity entails to the broader public as well as to policy makers is

very important, and, therefore, should be an accompanying element of the strategy. One of the main reasons why people cannot fathom the threat of biodiversity loss is because they do not understand how it would impact their lives, or because politicians do not give it an economic dimension. Therefore, we think that approaches like the TEEB study, or consumer campaigns making the threat of biodiversity loss practically visible should be enhanced under the new strategy. Further studies that point out the economic costs for the society will help to increase the acknowledgement of the issue by policymakers. Initiatives such as an EU biodiversity award could also be a positive element in the future strategy.

- Sub target 1 **Sub-target 1 (ST1) Integration and sustainable use of resources (agriculture and agro-ecosystems)**

We agree that agriculture must be included in one of the priorities, as unsustainable food production is one of the main reasons of biodiversity decline. However, we want to stress that the strategy needs to focus on enhancing sustainable food production systems. Looking only at agriculture would not take us far enough. It is also important that farmers can sell their "biodiversity" to the food chain. This means that retailers, shops or political initiatives, for instance, should offer market opportunities for products that have been produced by systems that enhance biodiversity, such as Organic Farming or High Nature Value farming. Farmers are often the weakest point in the production chain and rely, therefore, on the other end of it.
Therefore, we suggest extending the sub-target 1 to food production systems, rather than limiting it to agriculture alone.

b) Detailed comments on Sub-target 1 (ST1)

IFOAM EU Group considers the protection of biodiversity as part of a comprehensive strategy for sustainability, including approaches to meet other challenges such as climate change, soil degradation and water pollution. Comprehensive approaches are necessary if we do not want to risk finding a single solution for one problem at the expense of another. Protecting biodiversity is a necessity because of its intrinsic value, but also because of future food security (as the sustainable productivity of agricultural systems highly depends on a diversity of soil organisms, predators, pollinators and related wild plants, as well as domestic plant species and varieties, and animal breeds).***IFOAM EU Group believes that a couple of measures are needed and that organic production should play a prominent role in a future biodiversity strategy within the sub-target 1.***

- **The Role of Organic production in biodiversity protection**:

Organic food and farming could be a powerful tool in the area of food production to protect biodiversity and should be given a central role in the strategy sub-target 1.

IFOAM EU Group suggests setting a political target in order to convert a certain area in the EU to organic production, for instance 20 percent by 2020. Organic production is the only production system, clearly defined and legislated by Regulation (EC) 834/2007 at EU level, that aims to "establish a sustainable management system for agriculture", that "respects nature's systems and cycles," and that produces high quality foods in ways that "do not harm the environment, human health, plant health or animal health and welfare."Organic production is therefore suitable to become a part of the biodiversity strategy since its success is easily measurable, and since science has proven its value.

The diversity of species on organic farms is predominantly the result of the very specific organic techniques of farmers, including banning the use of pesticides, herbicides and fast-release fertilizers. An organic farm becomes more successful in a diversified landscape where there are sufficient semi-natural landscape elements like hedgerows, fallow ruderal habitats and wildflower strips, which serve as natural means of controlling pests (Zehnder et al., 2007). Soil quality management (e.g. enrichment with compost), tillage practices (e.g. conservation tillage), crop rotation and intercropping are important additional measures, aimed at lowering the risk of pest and disease outbreaks. It is therefore in the economic interest of organic farmers to enhance diversity at all levels, because organic weed, pest and disease management would fail without high diversity.

Comparative biodiversity assessments on organic and conventional farms reveal a 30 per cent higher species diversity and a 50 per cent greater abundance of beneficial animals in organic fields (Bengtsson, Ahnstrom and Weibull, 2005; Hole et al., 2005). The higher biodiversity applies to many different taxonomic groups, including micro-organisms, earthworms, insects and birds (Hole et al., 2005). In regions where the number of organic farms has increased, the diversity and abundance of bees has grown considerably, which contributes to the pollination of crops and wild plants over larger areas (Rundlöf, Nilsson and Smith, 2008).

- **The broader frame – sustainable food systems to contribute to biodiversity and other aspects of sustainability**

Biodiversity protection in the context of agriculture and food systems has to be seen in broader context of shaping truly sustainable food systems. Organic production can play a strategic role as a leading

sustainable food system, a 'learning camp for sustainability,' offering to generate knowledge, technologies and practices relevant to other food production systems. But the strategic role of organic production goes far beyond the benefits of the organic food system itself:

- Organic production is a holistic approach based on a whole-system understanding rather than linear "one problem – one solution" approach, and represents an optimised form of multifunctional agriculture, delivering both marketed and non-marketed ecosystem services.
- Organic production as the benchmark for sustainability of agricultural methods drives progress across the agricultural sector by stimulating creative competition and improved sustainability in all food systems.
- The organic sector is highly innovative and has produced many smart and green technologies. Restrictions on inputs and methods drive innovation, converting organic systems into creative living laboratories. Approaches and techniques developed within the organic system are often easily transferrable to other food and farming systems.
- Organic production has received relatively little investment but has nonetheless been extraordinarily successful. There is a huge potential for the sector to deliver tremendous benefits with more support.
- Organic production can facilitate the development of low-carbon and resource efficient food systems. Modern food production's dependence on fossil fuels and other inputs with limited availability, such as phosphorus, highlights the necessity of 'transition farming' practices, which will enable food production to reduce external inputs, increase resource- efficiency and develop superior nutrient cycles.

- **IFOAM EU Group suggests the following actions**:
  - Organic Farming should be considered as a central strategic tool for the EU biodiversity strategy with regard to farmlands; this means to employ Organic Farming strategically in environmentally sensitive areas designated under the Nitrates Directive as vulnerable zones, under the Habitats and Birds Directive as Natura 2000 sites, or as indicated in the Water Framework Directive and in national legislation. All member states should be encouraged to use Organic Farming as a measure for environmental protection in these areas and to improve farmer's income by supporting it appropriately.
  - Set political goal of 20 percent organic land area in the EU by 2020.

- Encourage farmers in High Nature Value farming areas to convert to Organic Farming in order to best preserve biodiversity, and to boost income with value added products.
- Establish partnerships between DG Environment's Business and Biodiversity platform and organic businesses with special programmes on Biodiversity; encourage further engagement of processors and retailers in biodiversity programmes.
- The Common Agricultural Policy must support Organic Farming in all regions in order to enhance biodiversity on farm land, and support targeted biodiversity measures in regions with specific characteristics regarding biodiversity

- **CAP 2013 as key challenge**

The success of the biodiversity strategy in food production will depend on the outcome of the design of the post-2013 Common Agricultural Policy (CAP). The CAP is one of the main instruments the European Union can use to adapt agricultural practices for future challenges such as biodiversity protection. The main part of the CAP budget still goes to untargeted support, mainly because of historical considerations that favour unsustainable practices. This situation must be changed, so that taxpayers' money spent for the CAP could finally serve the public interest. Biodiversity on farm land must be one of the criteria to measure the value of CAP instruments. Targeting biodiversity in the framework of a broad sustainability approach must be brought into line with the production of high quality food and the contribution to the development of a prosperous countryside and fair farm incomes. The CAP must set incentives for conversion to more sustainable farming systems with respect to soil preservation, climate change mitigation and the halt of biodiversity loss.

The farming systems that already deliver a higher amount of public goods such as Organic Farming and High Nature Value farming should be promoted as high tier measures. Organic Farming delivers the best total package with respect to all aspects of sustainability, therefore it should play a central role in the future CAP. As a priority measure in all axes, support for Organic Farming should become compulsory in all Member States and regions. (CAP position papers - see ANNEX)

<u>Recommendations:</u>

- Design the new CAP to deliver a clearly targeted system of support measures that increases sustainability in farming, including biodiversity. Aim for comprehensive agricultural systems that deliver on all aspects of sustainability. Organic Farming, as a comprehensive approach, must be given a central role as a model and best practice measure: it should become the leading measure under agri-environment schemes, but must also be emphasized in all other measures, such as education and training, capital investment grants,

marketing and promotion measures, farm diversification, local action groups and so forth, wherein a proportion of the budget should be dedicated to Organic Farming and/or a bonus offered for these measures on organic farms.

- High Nature Value farming, often conducted by small and semi-subsistence farmers as a farming system leading to high biodiversity, also needs sufficient support in training, infrastructures and market access to continue traditional farming practices that lead to diversity rich vegetation patterns. Conversion to Organic Farming must be considered here as a measure to increase the income and to bring the best of traditional practices together with modern sustainability approaches.
- Make support for Organic Farming mandatory within the CAP. There is currently no obligation for Member States to consider organic production as a measure under the CAP. In recognition of the strategic importance of organic production, support for conversion and maintenance of Organic Farming should become a rule in all Member States.
- Agro-Biodiversity which we consider in a diversity of species, varieties, breeds, ecosystems and landscapes, should be efficiently supported by Rural Development Programmes; this includes for example traditional orchards with diverse fruit species and varieties
- Advisory services and training for farmers supported by the CAP should include information on best biodiversity practices and Organic Farming in their advisory and training programmes.
- Policy coherence: It must be guaranteed that all measures supported under the CAP do not contradict the sustainability objectives and do not harm wild and domestic biodiversity.

- **Rural Development in the context of other European legislation**

Small farms in remote regions often manage lands with rich biodiversity; the grasslands and meadows are often grazed by ruminants. If these grasslands were converted to arable land, the farms were abandoned, and the land was left to forestation, traditional landscapes bearing rich biodiversity would be lost. Farmers are land major managers, therefore the socio-economic aspect plays a crucial role in halting the loss of biodiversity on farm land. These farmers need access to remunerative markets in order to maintain sustainable farming practices. Organic Farming can offer new income opportunities for these high-nature-value farmers, as it allows them to market products under the organic logo for higher prices. Local processing and direct marketing, which are often connected with organic farms, add value to products and support rural employment. Many small and medium livestock farmers in remote areas lost and loose market access due to structural change in the food processing sector: EU food hygiene rules are often handled in an inappropriate way for small scale and local processing, and economic pressure increases, therefore many smaller

slaughterhouses and milk processing plants had to shut down in recent years. Farmers are therefore forced to go to larger processing facilities, which often results in higher costs and difficulties to obtain an individual and authentic local product with added value. This is a serious obstacle, and many farmers therefore give up keeping animals, leaving their land to forestation or neighbours that convert it to arable land – all with a negative impact on biodiversity. This process needs to be reversed.

Conclusion:

- Socio-economic rural development has an indirect impact on biodiversity; if policy coherence is to be reached, the biodiversity aspect needs to be considered in rural as well as in regional development programmes and other legislation that impacts farmers and food processing.

Actions

- Support and encourage local processing and direct marketing as well as special quality programmes for Organic Farming and/or geographic indications to help farmers in remote and high nature value areas to obtain a remunerative income
- Conduct training programmes for small scale processors and veterinarians on food hygiene measures that comply with EU legislation, but are adapted to small and local processing and to direct marketing in order to facilitate market access for small farmers in remote regions
- Encourage members states to use flexibility to support small scale food production (European hygiene Regulations include provisions for flexibility. In accordance with the principle of subsidiarity, Member States are placed to find appropriate solutions based on local situations and on appropriate levels of hygiene in these businesses, without compromising the objective of food safety)

- **Agro biodiversity**:

Maintaining and developing a wide agro-biodiversity of plant varieties and animal breeds that are adapted to different environmental conditions and that show robust performance under low-input/organic management will be key for the success of the future EU biodiversity strategy. It is also an investment for food security, particularly as food production in the near future may need to react to changing climate conditions and higher input prices. It is important that concepts that enhance agro-biodiversity be strengthened, and marketing initiatives increased. Already today, organic breeders and farmers seek to maintain and develop breeds and varieties that perform consistently under organic/low input conditions, but they have to struggle with restrictive rules for the marketing of their seed and a lack of financial

investment in breeding programmes. Furthermore, the seed market is strongly dominated by multi-national companies that sell unified seeds and breeds, and their practices are a huge threat to current and future agro-biodiversity. The EU's legal framework for the marketing of seeds is now under revision, and there is a chance that the biodiversity strategy will direct impact this process. The new rules must be tailored in a way that they facilitate market access for small breeders such as breeders of organic and locally adapted varieties.

IFOAM EU Group proposes the following steps:

- Adequately finance 10-year participatory breeding programmes for locally adapted and organic plant varieties and animal breeds, taking into account the interests of farmers, consumers and environmental groups,, to enhance agro-biodiversity, strengthen the capacities of the food sector to adapt to climate change, and strengthen biodiversity within low input/Organic Farming.
- Improve market access for traditional, locally-adapted, organic and open-pollinating varieties, conservation varieties and seed mixtures.
- Reformulate the Distinctness, Uniformity and Stability (DUS) criteria and abandon the outdated “Value for Cultivation and Use“ (VCU) in seed marketing regulations in order to give small breeders and farmers the right to add to the further development of agro-biodiversity. For the sake of transparency, a mechanism to compare regional varieties that replaces the VCU and is tailored to the needs of end users should be established.
- Significantly increase the share of organic products in EU institutions and national ministries to support Green Public Procurement.
- To contribute to the maintenance and further development of agro-biodiversity, farmers, amateurs and breeders rely on guaranteed GMO free seed. Therefore, the breeding methods must be clear on seed labels, so that organic breeders, farmers and gardeners can choose appropriate seeds. Moreover, a European-wide legal framework that finally ensures the maintenance of freedom from GMO contamination must be established. Under this framework, a labelling threshold for the adventitious and technically unavoidable presence of GMOs in GMO-free seeds must be set at a practical and technical detection limit.

- **EU Research Programme:**

One of the main funding schemes of the EU is the 8th Framework Research Programme of the EU with €53 billion (2007-2013). Scientific research is one of the main driving forces behind the endeavour to find solutions to the key problems facing society and to develop innovations. ***Therefore both within future agriculture and food related research***

priority should be given to food systems that have positive effects on maintaining biodiversity. The research technology platform TP Organics has outlined concrete research priorities.
http://www.tporganics.eu/

- **Pesticide and fertilizer tax:**

Encourage member states to set up taxes for agricultural inputs such as non-organic fertilizers and pesticides that have a negative impact on biodiversity and lead to farming practices that externalize costs by causing environmental harm, which places a considerable economic burden on society.

- **Soil biodiversity**

Soil is subject to over-exploitation in many regions of the European Union, resulting in soil erosion and other forms of degradation. Soil biodiversity is the basis of both future food security and plant and animal diversity. Organic Farming contributes to building up a healthy soil life by making use of organic matter to stabilize the soil system**. We recommend the adoption of an EU wide legal framework for the protection of soils, as proposed by the European Commission. This framework should target the maintenance and development of stable soils, rich in organic matter, for farm land areas.**

- **Development aid.**

The EU is the biggest donor for development aid worldwide. Significant amounts will be given to development projects that will have a direct and indirect impact on biodiversity in respective countries. The maintenance of a rich biodiversity does not contradict the goal to develop a country economically; on the contrary, it has to be regarded as an investment in the country's potential to feed itself in the future, in upcoming business opportunities, and in the quality of life for future generations. ***Therefore we recommend that the impact on sustainability, including biodiversity, be considered more thoroughly before EU development grants are allocated for projects.***

I trust that you find our input useful, and hope that we managed to contribute to your efforts in shaping a future biodiversity strategy. Please find attached a list of documents that might help you in this endeavour.

Marco Schlüter
Director

Annex: Documents that might be of interest for drafting the future biodiversity strategy

**** TP Organics: Research Platform Organic food and farming***

- **Vision Research Agenda to 2025**

http://www.tporganics.eu/index.php/vision.html

- **Strategic Research Agenda**

http://www.tporganics.eu/index.php/strategicagenda.html

**** IFOAM EU Group: Shaping Agriculture and Food Systems to Future Challenges – The Strategic Role of Organic Food and Farming,*** Recommendations to the new European Commission and the European Parliament for a coherent framework of policies to support organic food and farming
http://www.ifoam-eu.org/positions/Papers/pdf/Position_IFOAMEU_StrategicRole-of-OA_7.06.2010.pdf

****CAP position papers***

IFOAM EU Group, 2010: CAP post 2013 – Smart change or business as usual? High time to align the Common Agricultural Policy (CAP) with the demands for high quality food, sustainable agriculture and a future perspective for farmers.

http://www.ifoam-eu.org/positions/Papers/pdf/Position_IFOAMEU_CAP_final_7.05.2010.pdf

BirdLife International, EEB, EFNCP, IFOAM EU and WWF, 2009: Common Vision on a CAP post 2013
http://www.ifoam-eu.org/positions/publications/pdf/Proposal_for_a_new_common_agricultural_policy_FINAL_03.2010.pdf

**** Quoted and further Literature on biodiversity and Organic Farming:***

Albrecht, H. 2005. Development of arable weed seedbanks during the 6 years after the change from conventional to organic farming. - Weed Research 45: 339-350.

Altieri M and Nicholls C (2006). Agroecology and the search for a truly sustainable agriculture. Berkeley, CA, University of California.

Altieri, M. A., Ponti, L. and Nicholls, C. (2005). Enhanced pest management through soil health: toward a belowground habitat management strategy. Biodynamics (Summer): 33-40.

Andersen, A., Sjursen, H., Rafoss, T., 2004. Biodiversity of Agromyzidae (Diptera) in biologically and conventionally grown spring barley and grass field. Biological Agriculture and Horticulture, 22: 143-155.

Bengtsson, J., Ahnström, J., Weibull, A.C., 2005. The effects of organic agriculture on biodiversity and abundance: a meta-analysis. Journal of Applied Ecology 42: 261-269.

Benton, T.G., Vickery, J.A., Wilson, J.D., 2003. Farmland biodiversity: is habitat heterogeneity the key? Trends in Ecology & Evolution, 18: 182-188.

Birkhofer, K., Bezemer, T.M., Bloem, J., Bonkowski, M., Christensen, S., Dubois, D., Ekelund, F., Fließbach, A., Gunst, L., Hedlund, K., Mäder, P., Mikola, J., Robin, C., Setälä, H., Tatin-Froux, F., Van der Putten, W.H., Scheu, S. 2008a. Long-term organic farming fosters below and aboveground biota: Implications for soil quality, biological control and productivity. Soil Biology and Biochemistry 40:2297-2308.

Birkhofer, K., Fließbach, A., Wise, D.H., Scheu, S. 2008b. Generalist predators in organically and conventionally managed grass-clover fields: implications for conservation biological control. Annals of applied Biology 153:271-280.

Boutin, C., Baril, A., Martin, P. A. 2008. Plant diversity in crop fields and woody hedgerows of organic and conventional farms in contrasting landscapes. - Agriculture Ecosystems & Environment, 123: 185-193.

Esperschütz, J., Gattinger, A., Mäder, P., Schloter, M., Fließbach, A. 2007. Response of soil microbial biomass and community structures to conventional and organic farming systems under identical crop rotations', FEMS Microbiology Ecology, 61(1): 26-37.

FAO, 2002. Organic agriculture, environment and food security. Environmental Natural Resources No. 4. FAO Rom.

Füller, R.J., Norton, L.R., Feber, R.E., Johnson, P.J., Chamberlain, D.E., Joys, A.C., Mathews, F., Stuart, R.C., Townsend, M.C, Manley, W.J., Wolfe, M.S., Macdonald, D.W. Firbank, L.G., 2005. Benefits of organic farming to biodiversity vary among taxa. Biology Letters 1: 431-434.

Gabriel, D., Roschewitz, I., Tscharntke, T., Thies, C., 2006. Beta diversity at different spatial scales: plant communities in organic and conventional agriculture. Ecological Applications 16: 2011-2021.

Gabriel, D., Tscharntke, T., 2007. Insect pollinated plants benefit from organicfarming. Agriculture, Ecosystems and Environment 118:43-48.

Gibson, R. H., Pearce, S., Morris, R. J., Symondson, W. O. C. and Memmott, J. 2007. Plant diversity and land use under organic and conventional agriculture: a whole-farm approach. Journal of Applied Ecology 44: 792-803.

Hole, D.G., Perkins, A.J., Wilson, J.D., Alexander, I.H., Grice, P.V., Evans, A.D., 2005. Does organic farming benefit biodiversity? Biological Conservation 122: 113-130.

Holzschuh, A., Stefan-Dewenter, L, Kleijn, D., Tscharntke, T 2007. Diversity of flower-visiting bees in cereal fields: effects of farming System, landscape composition and regional context. Journal of Applied Ecology 44: 41-49.

Holzschuh, A., Stefan-Dewenter, I. and Tscharntke, T., 2008. Agricultural landscapes with organic crops support higher pollinator diversity. Oikos 117: 354-361.

Hutton, S.A., Giller, P.S., 2003. The effects of the intensification of agriculture on northern temperate düng beetle communities. Journal of Applied Ecology 40: 994-1007.

Klingen, I., Eilenberg, J., Meadow, R., 2002. Effects of farming System, field margins and bait insect on the occurrence of insect pathogenicfungi in soils. Agriculture, Ecosystems and Environment 91: 191-198.

Kragten, S., de Snoo, G.R. 2006. Breeding birds on organic and conventional arable farms in the Netherlands. -Journal of Ornithology 147: 104-104.

Kragten, S., de Snoo, G.R. 2008a. Field-breeding birds on organic and conventional arable farms in the Netherlands. Agriculture, Ecosystems & Environment, 126: 270-274.

Kragten, S., Trimbos, K.B., de Snoo, G.R. 2008b. Breeding skylarks (Alauda arvensis) on organic and conventional arable farms in The Netherlands. Agriculture, Ecosystems & Environment, 126: 163-167.
Kramer, S.B., Reganold, J.P., Glover, J.D., Bohannan, B.J.M., Mooney, H.A. 2006. Reduced nitrate leaching and enhanced denitrifier activity and efficiency in organically fertilized soils. Proc. Natl. Acad. Sci. USA 103:4522-4527.

Kremen, C., Williams, N.M., Aizen, M.A., Gemmill-Herren, B., LeBuhn, G., Minckley R., Packer, L., Potts, S.G., Roulston, T., Steffan-Dewenter, I., Vázquez, D.P., Winfree, R., Adams, L., Crone, E.E., Greenleaf, S.S., Keitt, T.H., Klein, A.-M., Regetz, J., Ricketts, T.H. 2007. Pollination and other ecosystem services produced by mobile organisms: a conceptual framework for the effects of land-use change. Ecology Letters, 10: 299-314.

Mäder, P., Fließbach, A., Dubois, D., Gunst, L., Fried, P. und Niggli, U., 2002. Soil fertility and biodiversity in organicfarming. Science296: 1694-1697.

Moradin, L.A., Winston, M.L., 2005. Wild bee abundance and seed production in conventional, organic, and genetically modified canola. Ecological Applications 15: 871-881.

NABU 2004. Vögel der Agrarlandschaft - Bestand, Gefährdung, Schutz. Naturschutzbund Deutschland e.V., Berlin, p 44.

Neumann, H., Loges, R., Taube, F., 2007. Fördert der ökologische Landbau die Vielfalt und Häufigkeit von Brutvögeln auf Ackerflächen? Berichte über Landwirtschaft 85, 272-299.

Niggli, U., Fliessbach, A., Hepperly P., Scialabba, N., 2009. Low Greenhouse Gas Agriculture: Mitigation and Adaptation Potential of Sustainable Farming Systems. FAO, Rev. 2.

Pfiffner, L., Luka, H., 2003. Effects of low-input farming Systems on carabids and epigeal spiders - a paired farm approach. Basic and Applied Ecology 4: 117-127.

Pimentel, D., Hepperly, P., Hanson, J., Douds, D., Seidel, R., 2005. Environmental, energetic, and economiccomparisons of organic and conventional farming Systems. Bioscience, 55(7): 573-582.

Rundlöf M, Nilsson H and Smith HG (2008). Interacting effects of farming practice and landscape context on bumble bees. Biological Conservation, 141: 417–426.

Rundlöf, M., Smith, H. 2006. The effect of organic farming on butterfly diversity depends on landscape context. Journal of Applied Ecology, 43: 1121-1127.

Schader, C., Pfiffner, L., Schlauer, C., Stolze, M., 2008. Umsetzung von Ökomassnahmen auf Bio- und ÖLN-Betrieben. Agrarforschung 15: 506-511.

Siegrist, S., Schaub, D., Pfiffner, L., Mäder, P., 1998. Does organic agriculture reduce soil erodibility? The results of a longterm field study on loess in Switzerland. Agriculture, Ecosystems and Environment 69: 253-265.

Wickramasinghe, L.P., Harris, S., Jones, G., Vaughan, N., 2003. Bat activity and species richness on organic and conventional farms: impact of agricultural intensification. Journal of Applied Ecology, 40: 984-993.

Wilson, J.D., Evans, J., Browne, S.J., King, J.R., 1997. Territory distribution and breeding success of skylarks Alauda arvensis on organic

and intensive farmland in southern England. Journal of Applied Ecology 34: 1462-1478.

Wilson, J., 1995. The effect of organic farming systems on breeding and wintering bird populations. Britain's Birds in 1991-92: the conservation and monitoring review. S. Carter, British Trust for Ornithology and Joint Nature Conservation Commitee: 67-72.

Zehnder, G., Gurr, G.M., Kühne, S., Wade, M.R., Wratten, S.D., Wyss, E., 2007. Arthropod pest management in organic crops. Annual Review of Entomology, 52: 57-80.