Bibliography on the relationship of ecological farming and landscapes, research papers and reports

From the Web of Science and other sources, Klaus Ammann 5.4.2009

Angevin, F., E. K. Klein, C. Choimet, A. Gauffreteau, C. Lavigne, A. Messean and J. M. Meynard (2008). "Modelling impacts of cropping systems and climate on maize cross-pollination in agricultural landscapes: The MAPOD model." European Journal of Agronomy **28**(3): 471-484.

<Go to ISI>://000253941500032

New concerns about crop coexistence in agricultural landscapes are being expressed in reaction to the prospect of introducing transgenic crops into European cropping systems: these include meeting current consumer demand for non-GM products, respecting threshold levels required for organic farming labels as well as keeping food cultures separated from those destined for the pharmaceutical and energy industries. To address these concerns in the case of maize crops, we have chosen a modelling approach. Our aim was to simulate cross-pollination in the case of existing agricultural landscapes, taking into account the effect of climate and cropping techniques in order to forecast gene escape from genetically modified maize to non-GM maize. The resulting spatially explicit model, MAPOD (Matricial Approach to Pollen Dispersal), is presented in this paper. A preliminary evaluation is also provided. Pollen exchanges between GM and non-GM maize crops are simulated and influencing factors such as field sizes and shapes, distribution of GM and non-GM fields in the agricultural landscape as well as flowering dates and dynamics are integrated. Model parameter values were either derived from existing models of pollen dispersal or estimated from experimental field studies. The preliminary evaluation of MAPOD was carried out by comparing simulation results with data from two French and one American gene flow field trials. MAPOD was found to provide good average predictive values. Examples of output data illustrate the capacity of the model to simulate a wide range of agricultural contexts. These simulation results provide a basis for designing coexistence rules and monitoring procedure set-up. (c) 2007 Elsevier B.V. All rights reserved.

Belfrage, K., J. Bjorklund and L. Salomonsson (2005). "The effects of farm size and organic farming on diversity of birds, pollinators, and plants in a Swedish landscape." Ambio **34**(8): 582-588.

<Go to ISI>://000234658200002

This study compares diversity and abundance of birds plus abundance of butterflies, bumblebees and herbaceous plants between six small farms (< 52 ha arable land) and six large farms (> 135 ha arable land) in Roslagen in southeastern Sweden. Two of the large and four of the small farms were organic. Large-scale landscape mosaic and underlying bedrock were similar for all farms. Statistical analysis was performed using box-plots on medians and analysis of variance on mean values. More than twice as many bird species and territories, butterflies, and herbaceous plant species, and five times more bumblebees were found on the small compared to the large farms. The largest differences were found between small organic and large conventional farms. Differences were also noted between small and large organic farms: 56% more bird species were found on small organic than on large organic farms, although none of the farms used any pesticides. We therefore argue that the consideration of organic agriculture's effect on biodiversity should include factors affected by farm size.

Biaggini, M., R. Consorti, L. Dapporto, M. Dellacasa, E. Paggetti and C. Corti (2007). "The taxonomic level order as a possible tool for rapid assessment of Arthropod diversity in agricultural landscapes." Agriculture Ecosystems & Environment **122**(2): 183-191.

<Go to ISI>://000247191600005

Increasingly intensive agriculture production methods, involving a widespread use of agro-chemicals and the progressive loss of many natural and semi-natural habitats have led to an impoverished wildlife in agro-ecosystems. The awareness of the necessity to conserve, enhance or restore biodiversity in depleted agricultural landscapes has increased in the last decades. Recently new agro-environment schemes and biological compensation programmes have been proposed and they need biodiversity assessment to verify the efficacy of the planned agricultural practices. However, biodiversity assessments often require much effort in terms of time and economical resources. In particular, when analysing Arthropods, one of the groups most commonly used to assess biodiversity in agro-ecosystems, the employment of taxonomists is required for species identification. In this paper we have tried to develop a rapid procedure to assess Arthropod biodiversity in agro-ecosystems. In particular we tested the reliability of two higher taxa as surrogates for Arthropod diversity: order for all the specimens and family for Coleoptera. We collected Arthropods by pitfall traps, both in cultivated and semi-natural micro-habitats, mainly focusing on two different agricultural managements: an intensive wheat field and an experimental one with organic farming and semi-natural habitat conservation. Higher taxa results were compared to those obtained from analysing Carabidae at species level. The use of order level allowed us to clearly distinguish among main land uses on the basis of their faunal composition and diversity. Most prominent, order level analyses gave outcomes comparable to those obtained considering Carabidae species. Conversely, analyses conducted at family level for Coleoptera did not reveal any distinction among land uses. Furthermore, we tested the possibility of shortening the sampling period: about 4 months of surveys seemed to give results very similar to those obtained in a whole year of field activity. We propose our methodology as a possible useful short-cut to assess biodiversity in agricultural landscapes at a local scale. Order surrogacy together with the sampling procedure that we adopted could be seen as a preliminary approach, at least in a first phase of an investigation. This method could be particularly useful when results are required rapidly and in a context of limited financial resources. (C) 2007 Elsevier B.V. All rights reserved.

Borsotto, P., R. Henke, M. C. Macri and C. Salvioni (2008). Participation in rural landscape conservation schemes in Italy.

The objective of this paper is to provide an empirical investigation into the decision to participate in rural landscape conservation schemes in Italy. Although the high emphasis given to this issue and the increasing resources devoted to the landscape conservation sehemes in the Rural Development Programmes (RDP) implemented by the Italian regions, farmers' participation is still very low. A better understanding what motivates farmers to participate may help to increase adoption of the scheme and the effectiveness of the scheme design itself. In this paper we use data from 2149 household farms located in three Italian northern regions - Alto Adige. Lombardy and Piedmont - extracted from the Farm Accountancy Data Network sample, to estimate a discrete choice model aimed at identifying the variables that affect the probability of participating in a landscape conservation scheme. The model results indicate that participation correlates to farmer income. In addition to this, the probability is influences by farm characteristics: mainly the use of organic farming practices, specialisation in livestock production and location of the farm in mountain areas.

Boutin, C., A. Baril and P. A. Martin (2008). "Plant diversity in crop fields and woody hedgerows of organic and conventional farms in contrasting landscapes." Agriculture Ecosystems & Environment **123**(1-3): 185-193.

<Go to ISI>://000251149800020

The purpose of this study was to determine the effects of contrasting agricultural practices in organic and conventional farming (local factors), and to evaluate the influence of surrounding landscape features (regional factors) on plant assemblages, taking into account habitat structure. Plants were inventoried in crop fields and woody hedgerows (boundary and centre) of 16 conventional and 14 organic sites. Habitat structure, agricultural practices and landscape characteristics were quantified for each habitat. Hedgerow boundaries contained a higher number of plant species than adjacent habitats although many of them were exotics. However, exotics comprised a decreasing proportion of species richness from field to hedgerow centre. Many of the exotic species were shared between crop fields and adjacent boundaries. There was a clear difference in species richness and composition between the organic and conventional study sites. Fields and woody hedgerows situated in organic sites consistently harboured more native and exotic plant species than those in conventional systems. Numerous species were only found in organic hedgerows and included several long-lived herbaceous forest species. At the larger scale level, old-fields (areas with sparse shrubs and trees re-colonizing cleared land) were the only habitats that significantly influenced the species composition of hedgerows, particularly exotic species. Conversely, farm type was a significant predictor of native species richness. (c) 2007 Elsevier B.V. All rights reserved.

Clemetsen, M. and J. van Laar (2000). "The contribution of organic agriculture to landscape quality in the Sogn og Fjordane region of Western Norway." Agriculture Ecosystems & Environment **77**(1-2): 125-141.

<Go to ISI>://000084356400011

Clough, Y., A. Kruess, D. Kleijn and T. Tscharntke (2005). "Spider diversity in cereal fields: comparing factors at local, landscape and regional scales." Journal of Biogeography **32**(11): 2007-2014.

<Go to ISI>://000232493500013

Aim Factors acting at various scales may affect biodiversity, demanding analyses at multiple spatial scales in order to understand how community richness is determined. Here, we adopted a hierarchical approach to test the contribution of region, landscape heterogeneity, local management (organic vs. conventional) and location within field (edge vs. centre) to the species richness and abundance of spiders in cereals. Location Three regions of western and central Germany: Leine Bergland, Soester Boerde, and Lahn-Dill Bergland. Methods Forty-two paired organic and conventional winter wheat fields were compared. Field pairs were located in areas ranging from structurally simple to structurally complex landscapes. In May and June 2003, spiders were sampled using pitfall traps. Linear mixed models were used to determine the relationship of spider diversity and abundance with regional spatial factors and landscape heterogeneity within a 500-m radius, as well as with local management and within-field location. Results Within-field location of the traps and landscape heterogeneity were the best predictors of species richness: more species were found in field edges and in heterogeneous landscapes. Region and local management had no effect on species richness. Activity density was higher in field edges and differed among regions. Main conclusions The diversity of farmland spiders was influenced by differences at two of the spatial scales (edge vs. centre, simple vs. complex landscapes), but not at the two others (field management, region), emphasizing the importance of analyses at a variety of spatial scales for an adequate explanation of patterns in biodiversity. Our study suggests that promoting heterogeneity in land use at landscape scales is one of the keys to promoting spider diversity in agroecosystems.

Clough, Y., A. Kruess and T. Tscharntke (2007). "Local and landscape factors in differently managed arable fields affect the insect herbivore community of a non-crop plant species." Journal of Applied Ecology **44**(1): 22-28.

<Go to ISI>://000243023600004

1. The expansion of simplified ecosystems such as intensively managed annual crops plays a big part in driving the global biodiversity crisis. Field-scale diversification, for example leaving weeds to grow in crops, is one way in which diversity in agro-ecosystems can be restored. However, little is known about the determinants of the non-crop plant-based insect communities within arable fields at local and larger spatial scales, an essential component in extrapolating plant diversity benefits to higher trophic levels. 2. We investigated how diversification of agro-ecosystems at the field and landscape levels affects the insect community of the creeping thistle Cirsium arvense. Artificial plots of the host-plant were established in three regions of Germany in 48 paired organic (diverse, weeds not controlled with herbicides) and conventional (simplified, very low weed density and species richness) wheat fields across a gradient of landscape heterogeneity, from simple arable-dominated to heterogeneous, diverse landscapes. 3. Leaf-feeding herbivores were monitored directly, while stem-boring herbivores and their parasitoids were quantified by dissecting the stems of the thistles. Land-use types and naturally occurring thistle stands were mapped within a radius of 1 km around each thistle plot. 4. Herbivore species richness was enhanced by both organic farming and landscape heterogeneity but not by higher densities of thistles in the landscape. For most of the species, host-plant plots in organic fields were more likely to be colonized than those in the conventional fields. The enhancement of diversity in organic fields is probably the result of a slightly higher natural cover of the host-plant Cirsium arvense. 5. Synthesis and applications. Both diversification of landscape (fewer arable crops, more perennial habitats) and extensification through organic management are effective measures of enhancing arthropod diversity on weeds. The impact of field-scale agri-environment schemes on biodiversity should be supplemented by including landscape-scale diversification programmes to include a minimum level of perennial habitat cover. Biodiversity benefits of organic agriculture rely for a large part on non-crop plants. Weed populations should be allowed to coexist with the crop to maintain these benefits, which are threatened by more intensive 'organic' management, such as heavy mechanical weed control.

Dharmakeerthi, R. S., B. D. Kay and E. G. Beauchamp (2006). "Spatial variability of in-season nitrogen uptake by corn across a variable landscape as affected by management." Agronomy Journal **98**(2): 255-264.

<Go to ISI>://WOS:000236152400004

An understanding of the spatial and temporal variability of N uptake at a landscape scale is required to implement site-specific N management. We determined the spatial variation of in-season N uptake and N nutritional status of corn (Zea mays L.) in a variable landscape in southern Ontario from 1997 to 2001 under three management conditions involving corn under no-tillage or conventional tillage using barley (Hordeum vulgare L.) or barley under-seeded with red clover (Trifolium pratense L.) as the preceding crop and with or without fertilizer N. The aerial dry matter content (DM) of corn and N concentrations in the DM (N-i) were determined at 2-wk intervals. Organic C (OC) content (0-0.3 m) was used as the landscape-based variable to account for the spatial variability of N uptake. Fertilizer N addition, legume incorporation, and tillage had significant positive effects on N uptake, but the magnitude of these effects varied within and among growing seasons. Nitrogen uptake increased with OC content in a quadratic relationship, reaching a maximum at OC content of about 26 g kg(-1). The N nutritional status in the DM, estimated using previously established critical dilution curves, also increased with OC content. However, the nutritional status decreased as the growing season progressed under all management treatments; this decrease was largest at the smallest OC contents. These trends suggest that measurements of plant N early in the season cannot be used in site-specific N management to accurately identify areas of adequate or excess N later in the growing season.

Doing, H. (1997). "The landscape as an ecosystem." Agriculture Ecosystems & Environment **63**(2-3): 221-225.

<Go to ISI>://A1997XH20900011

Landscape, in this paper, is defined as ''a complex of geographically, functionally and historically interrelated ecosystems'' (also: ''organised land''). For its planning and management, mapping of geomorphological, hydrological, and climatic conditions is crucial to understand the ecological patterns. To warrant the landscape's sustainability, its ecosystems' multiple and interdependent functions should be carefully identified on macro-, meso- and micro-level. It is argued that, whereas a natural ecosystem is homogenous, the landscape ecosystem is heterogeneous, for example in a mosaic or zoned way. Like evolution in organisms, succession in ecosystems tends do develop toward increasing independency from environmental fluctuations (increasing autonomy of the systems). On the contrary, landscape ecosystems have increasingly lost their regional autonomy over the last decades, as external input technologies became favoured. However, theories and practices of ecological (organic) agriculture, low external input oriented as they are, tend to re-enforce the local ecosystems' autonomy together with the regional identity. In the Netherlands intensive and widespread land reclamation (polders and floodplains) made hydro-ecology a major landscape-ecology determinant. Distribution patterns of floristic species are found to reflect the hydro-dynamic conditions in natural and semi-natural ecosystems. Provided that suitable knowledge on local conditions is available, they can be used as indicators of potential sites for nature regeneration and indicate landscape degradation as well. Even though potentially favouring agro-ecosystems diversity and regional autonomy, ecological types of agriculture, as currently defined by law, do only promote nature on the farm when the farmer dedicates special attention it as an additional objective of his (organic) farming. (C) 1997 Elsevier Science B.V.

Egoz, S., J. Bowring and H. C. Perkins (2001). Tastes in tension: form, function, and meaning in New Zealand's farmed landscapes.

Landscapes are representations of a range of possible ways of life and people may interpret them in a variety of often conflicting ways, One expression of such tension occurs with respect to landscape tastes is illustrated in the paradox of New Zealand's organic farming landscapes. While organic practices are environmentally friendly, they do not have landscapes which are tidy and cultivated, and reflect New Zealand's legacy of a hardworking settler mentality. The landscapes on organic farms are, therefore. interpreted by some as being indicative of laziness and neglect and by others as responsible and environmentally healthy. In order to reveal the motives and values which engender this range of landscape tastes, an ethnographic approach was taken. Through in-depth interviews, this study explores the links between conventional and organic farmers' landscape tastes and associated values. This investigation is of particular relevance to landscape architecture, in the context of ongoing discussions of the "ecological aesthetic", a discussion which addresses a perceived dichotomy between aesthetics and ecology. The ways in which people relate to the form of ecologically sound farming practices, thus sheds light on the way form, function and meaning are constructed. This type of study constitutes a foundation for culturally sustainable landscape design. (C) 2001 Elsevier Science B.V. All rights reserved.

Emmerling, C. and T. Udelhoven (2002). "Discriminating factors of the spatial variability of soil quality parameters at landscape-scale." Journal of Plant Nutrition and Soil Science-Zeitschrift Fur Pflanzenernahrung Und Bodenkunde **165**(6): 706-712.

<Go to ISI>://000180151000008

The aim of the study was to evaluate the spatial variability pattern of some soil quality parameters at landscape-scale, particularly soil microbial biomass-C (C-mic) and -N (N-mic), and soil microbial activity (respiration) as well as soil organic carbon (C-mic), and hot water extractable carbon (C-hwe) by multivariate analyses of variance and canonical discriminant analyses (CDA). The study area was the Trier region, Rhineland-Palatinate, which is characterized by a wide range of soil types developed from various parent materials. Additionally, the investigated fields differed in soil management intensity (conventional, integrated, organic farming) and crops grown. Within the whole study area CDA revealed a separation into three sub-areas. Within the sub-areas the soil quality parameters were significantly influenced by the soil management systems and the crops grown. Despite the spatial variability and the relationship to soil management, the contents of C-mic could be predicted by stepwise multiple linear regression models, both for arable and grassland soils. The explained variance for the regression models were 72 % for arable soils and 63 % for grassland soils, respectively. Regression models for predicting N-mic and microbial activity revealed an explained variance between 30 and 58 %.

Filser, J., K. H. Mebes, K. Winter, A. Lang and C. Kampichler (2002). "Long-term dynamics and interrelationships of soil Collembola and microorganisms in an arable landscape following land use change." Geoderma **105**(3-4): 201-221.

<Go to ISI>://000173148400004

An arable landscape (150 ha) comprising a broad variety of soil types had been cultivated conventionally for many years. A small section had been intensively managed (hops), while another had been used as grassland. For 2 years at the beginning of our study, all arable land was cultivated with cereals only. After that, management was changed to integrated or organic farming, grassland or fallow land. Within a group of sites representing the variety of soil types and management systems, the development of soil microorganisms and Collembola was monitored every spring during an 8-year period. The microbial biomass compared to initial conditions under uniform management increased, particularly in land that had been set aside. General Collembola abundance slightly decreased, except for areas that had been converted to integrated farming, Protaphorura armata and Lepidocyrtus cyaneus decreased over the entire area, whereas the Isotoma viridis group was positively affected by conversion to integrated farming, Although recorded only once per year, the main results were comparable to data recorded in this area at higher temporal or spatial resolution. Nevertheless, site conditions may influence the reactions of soil organisms to land use change, and should be taken into account for evaluation. Biota resident in the upper 0-10 cm of the soil reflected current management practice, whereas those at greater soil depth reflected instead management history and soil properties. The microbial biomass and abundance of selected Collembola taxa were modeled using artificial intelligence methods (regression trees). Land management type was the most important factor determining soil biota performance. The variation of Collembola abundance depended additionally on microbial biomass. When supported by a sufficiently large data set, regression trees are powerful tools for explaining complex non-linear relationships. Finally, suggestions for the sampling design in future long-term studies at the landscape scale are given. (C) 2002 Elsevier Science B.V. All rights reserved.

Grierson, P. F. and M. A. Adams (1999). "Nutrient cycling and growth in forest ecosystems of south western Australia - Relevance to agricultural landscapes." Agroforestry Systems **45**(1-3): 215-244.

<Go to ISI>://000083412500012

Nutrient and hydrologic cycles in harvested native forests in southern Australia are largely balanced. For example, we have little or no evidence of any decline in nutrient capital or availability in harvested forests. Short-term and small-scale reductions in evapotranspiration due to loss of leaf area after harvesting are adequately balanced at the landscape scale by large areas of regenerating or older-age forest. In contrast, agricultural systems on similar soils are a) dependent on large inputs of fertilisers to maintain growth and b) frequently subject to increasing salinity and waterlogging or other forms of degradation. The large-scale replacement of long-lived communities of perennial and often deep- rooting native species with annual crops or other communities of shallow-rooting species might be better managed within the framework of knowledge developed from studies of native plant communities. However, application of such a mimic concept to systems of low natural productivity is limited when agricultural systems require continued high productivity. Nonetheless, the mimic concept may help in developing sustainable management of agriculture on marginal lands, and contribute to the nutritional resilience of agroecosystems. Relevant characteristics for mimic agroecosystems in south western Australia include: high species diversity, diversity of rooting attributes, utilisation of different forms of nutrients (especially of N and P) in space and time, and the promotion of practices which increase soil organic matter content.

Hendriks, K., D. J. Stobbelaar and J. D. van Mansvelt (2000). "The appearance of agriculture - An assessment of the quality of landscape of both organic and conventional horticultural farms in West Friesland." Agriculture Ecosystems & Environment **77**(1-2): 157-175.

<Go to ISI>://000084356400013

"This landscape is offered to you by the local farmers." In several places throughout the Netherlands and Belgium, billboards with such text can be found along the road. Perhaps the idea to promote farming in this way is new, but, for centuries, farmers, with their techniques and traditions, have strongly influenced the formation and nature of the surrounding landscapes. But what qualities do these landscapes have today? The aim of: this study is to assess the (potential) contribution of fanning systems to landscape quality. Eight horticultural farms in the region of West-Friesland (NL) were analysed after an intensive observation study during the four seasons of the year. A theory and a method on landscape quality at regional and farm level were developed. The starting point was that the visual quality of a landscape is determined mainly by four types of landscape coherence: vertical, horizontal, seasonal and historical. There are big differences between the landscape appearances of the eight farms, concerning, firstly, spatial aspects, Like scale, layout and patterns, and, secondly, temporal aspects, like the expression of seasons. As an instrument to assess the quality of farm appearances, reference images were defined. In general, the organic farms had a better landscape quality than the conventional farms. These results may offer possibilities to farmers, organisations and policy-makers to improve the qualities of the rural area, for example, by supporting landscape-friendly farming practices:or by local/regional platform discussions. The criteria used can be placed in the cultural realm of the framework created in the Concerted Action on Sustainable Development of Landscapes (see Stobbelaar and Van Mansvelt, 2000). (C) 2000 Elsevier Science B.V. All rights reserved.

Hendriks, K., D. J. Stobbelaar and J. D. van Mansvelt (2000). "The appearance of agriculture: An assessment of the quality of landscape of both organic and conventional horticultural farms in West Friesland." Agriculture, Ecosystems & Environment **77**(1-2): 157-175.

http://www.sciencedirect.com/science/article/B6T3Y-3Y21TSP-F/2/1cc4008e3c7d1dace1f0717470b211f4 AND http://www.botanischergarten.ch/Organic/Hendriks-Horticultural-Comparison-2000.pdf

“This landscape is offered to you by the local farmers.” In several places throughout the Netherlands and Belgium, billboards with such text can be found along the road. Perhaps the idea to promote farming in this way is new, but, for centuries, farmers, with their techniques and traditions, have strongly influenced the formation and nature of the surrounding landscapes. But what qualities do these landscapes have today?The aim of this study is to assess the (potential) contribution of farming systems to landscape quality. Eight horticultural farms in the region of West-Friesland (NL) were analysed after an intensive observation study during the four seasons of the year. A theory and a method on landscape quality at regional and farm level were developed. The starting point was that the visual quality of a landscape is determined mainly by four types of landscape coherence: vertical, horizontal, seasonal and historical. There are big differences between the landscape appearances of the eight farms, concerning, firstly, spatial aspects, like scale, layout and patterns, and, secondly, temporal aspects, like the expression of seasons. As an instrument to assess the quality of farm appearances, reference images were defined. In general, the organic farms had a better landscape quality than the conventional farms.These results may offer possibilities to farmers, organisations and policy-makers to improve the qualities of the rural area, for example, by supporting landscape-friendly farming practices or by local/regional platform discussions. The criteria used can be placed in the cultural realm of the framework created in the Concerted Action on Sustainable Development of Landscapes (see Stobbelaar and Van Mansvelt, 2000).

Hendriks, K., D. J. Stobbelaar and J. D. vanMansvelt (1997). "Some criteria for landscape quality applied on an organic goat farm in Gelderland, the Netherlands." Agriculture Ecosystems & Environment **63**(2-3): 185-200.

<Go to ISI>://A1997XH20900009

In the framework of the Concerted Action 'The Landscape and Nature Production Capacity of Organic\Sustainable Types of Agriculture', the authors visited the organic goat farm Capricas to test some criteria on farm level. Ten, mainly cultural, criteria had been selected because they were related to the field of work of the authors. The aim was to test the usability of the criteria in order to assess the farm's contribution to landscape quality. Data were gained during a day of fieldwork by direct observations, an interview and survey of the literature. The ten criteria appeared to be useful for describing the features which influence landscape quality. However, for measuring these criteria a clear reference is needed, which was not available in this exercise. Therefore, only a global valuation of the farm's contribution to the landscape quality can given so far. (C) 1997 Elsevier Science B.V.

Holzschuh, A., I. Steffan-Dewenter, D. Kleijn and T. Tscharntke (2007). "Diversity of flower-visiting bees in cereal fields: effects of farming system, landscape composition and regional context." Journal of Applied Ecology **44**(1): 41-49.

<Go to ISI>://000243023600006

1. Agri-environment schemes promote organic farming in an attempt to reduce the negative effects of agricultural intensification on farmland biodiversity and ecosystem services such as pollination. Farming system, landscape context and regional differences may all influence biodiversity, but their relative impact and possible interactions have been little explored. 2. The study was performed in three regions (150 km apart, 400-500 km(2) per region) differing in land use intensity. Within each region, seven pairs of conventionally and organically cultivated wheat fields (mean size 4 ha, 42 study fields) were selected to encompass a gradient from heterogeneous to homogeneous landscapes within a 1-km radius around each field. 3. Farming system had the greatest influence on biodiversity. Higher bee diversity, flower cover and diversity of flowering plants were recorded in organic compared with conventional fields. Bee diversity was related both to flower cover and diversity of flowering plants, suggesting plant-mediated effects of the farming system. 4. Differences in bee diversity between organic and conventional fields increased with the proportion of arable crops in the surrounding landscape, indicating that processes at the landscape level modified the effectiveness of organic farming in promoting biodiversity. Similar patterns for flower cover and diversity of flowering plants suggested that

landscape effects on bee diversity were mainly resource-mediated. After statistically removing the variance explained by flower parameters, residual bee diversity increased with increasing landscape heterogeneity. 5. Bee diversity differed between the three regions, but the effects of farming systems and landscape context were independent of regional differences. 6. Synthesis and applications. Bee diversity in wheat fields was mainly influenced by farming system, but an understanding of local bee diversity needs to incorporate both landscape and regional perspectives. The consistency of the results in three regions provides a reliable basis for management decisions. Agri-environment schemes that promote organic farming in homogeneous landscapes where there are few remaining flower-rich habitats could have the highest relative impact. However, while organic farming could help to sustain pollination services by generalist bees in agricultural landscapes, other measures are required to conserve more specialized bee species in semi-natural habitats.

IFOAM (2004). D2 Draft Biodiversity and Landscape Standards. IFOAM. Bonn, IFOAM (International Federation of Organic Agriculture Movements**:** 7.

Isaia, M., F. Bona and G. Badino (2006). "Influence of landscape diversity and agricultural practices on spider assemblage in Italian vineyards of Langa Astigiana (northwest Italy)." Environmental Entomology **35**(2): 297-307.

<Go to ISI>://000236865500015

The purpose of this study was to investigate spider assemblages of the Italian vineyards of Langa Astigiania (northwest Italy). Pitfall trapping and standardized hand collecting were combined to have an overall idea of the spider fauna living in this agroecosystem. A total of 138 samples for pitfall sampling and 92 for hand collecting sites were collected at 23 different times over a period of 2 yr (2003 and 2004). The vineyards differ mainly from agricultural practices (certified organic production, production according to EEC's Council Regulation 2092/91. on biological agriculture and intensive production) and for the heterogeneity of landscape matrix surrounding them. We studied the influence of these two factors on spider assemblages applying canonical correspondence analysis and multiresponse permutation procedures (MRPPs). Significant results of MRPP were analyzed in terms of hunting strategies. Significant differences are found among groups according to both landscape heterogeneity and agricultural practices, the first resulting more significantly. Analyzed in terms of hunting strategies, an increase in landscape heterogeneity seems to provide an increase in ambush spiders and specialized predators, whereas an increase in sheet web weavers seems to be related to homogeneous landscapes.

Jan Stobbelaar, D. and J. D. van Mansvelt (2000). "The process of landscape evaluation: Introduction to the 2nd special AGEE issue of the concerted action: “The landscape and nature production capacity of organic/sustainable types of agriculture”." Agriculture, Ecosystems & Environment **77**(1-2): 1-15.

http://www.sciencedirect.com/science/article/B6T3Y-3Y21TSP-1/2/e131160b5393220337c67a712a0b813b

In an EU concerted action a checklist with criteria for the development of sustainable rural landscape was created. The idea of the concerted action was to bring together experts from various disciplines involved in management of the countryside. They represented disciplines from [beta], [gamma] and [alpha] oriented sciences, ranging form environmentalists over sociologists to cultural geographers. They were all asked to list their (discipline’s) criteria and parameters for a sustainable management of the landscape. From all these criteria and parameters a checklist has been established. This checklist is presented in this paper, accompanied by an explanation of its basic concept that draws upon Maslow, its context, its methodology and its use. Finally summaries are presented of the ways the checklist, in various stages of its development, has been used in several European country countrysides. It can be concluded that the checklist is a useful tool for valuing the contribution of farms viz. farming systems to the regional development and the sustainability of the landscape. It was found that organic farms included in the sample of our research often performed rather well in that perspective as compared to the non-organic farms in that region.

Kajak, A. and J. Karg (2007). "Special section on: Organic matter content and soil fauna in agricultural landscape: Effects of distance to forested strips and of strip age." Polish Journal of Ecology **55**(4): 633-635.

<Go to ISI>://WOS:000251957300001

Kuiper, J. (1997). "Organic mixed farms in the landscape of a brook valley. How can a co-operative of organic mixed farms contribute to ecological and aesthetic qualities of a landscape?" Agriculture Ecosystems & Environment **63**(2-3): 121-132.

<Go to ISI>://A1997XH20900004

Under which conditions would an organic mixed farm co-operative contribute to the aesthetic and ecological quality of the landscape? The orientation of people in space and time is considered an important aspect of aesthetic quality. To facilitate orientation in space and time a landscape should supply information about the natural features, the history of the occupation and about the present meaning. Biodiversity, continuity and connectivity are important aspects of ecological quality. One organic mixed farm contributes to the local diversity. The diversity of land use types, including woodlots and Linear planting and crops is larger than on a traditional farm, as is the diversity of landscape elements, ecosystems and species. What would be a good location of several organic mixed farms (25 ha) if an important criterion is that a landscape should reflect its abiotic features? A fine grained landscape, which can be the effect of organic agriculture, fits best into a natural environment with great abiotic diversity per hectare. The landscape of the brook Baaksche Beek is such an area with large abiotic diversity per hectare. Would an organic mixed farm co-operative in this brook valley automatically contribute to ecological and aesthetic qualities of this landscape? There are landscape ecological and aesthetic objectives, which cannot be realised by the sum of planning at farm level. Three interrelated criteria, diversity, continuity and coherence, are used as a basis for planning at different planning levels. They are specified in planning objectives and design principles for the planning of planting elements and natural development in this break valley landscape. Whether such planning would interfere excessively with the organisation of each individual farmer is open to discussion. The proposal is to use these three criteria also as a basis for the evaluation of the contribution of organic mixed farms to the ecological and aesthetic quality of a particular European landscape. (C) 1997 Elsevier Science B.V.

Kuiper, J. (2000). A checklist approach to evaluate the contribution of organic farms to landscape quality.

Criteria need to be developed to evaluate the cultural environment of European rural landscapes. The goal is to evaluate and encourage the contribution of organic farming to sustainable landscape quality. Two sets of criteria were used to evaluate the quality of the cultural environment, non-expert and expert values. The non-expert values consisted of criteria for the appreciation of the present local landscape by users and inhabitants. These criteria were derived from psychological principles (Coeterier, 1996). The expert values for landscape assessment were derived from physiognomy, geography and landscape architecture. These criteria require specialized knowledge essential in understanding the cultural history of at least the regional landscape and in landscape planning. The criteria were derived from a reflection of landscape plans at different scale levels (Kuiper, 1998). This reflection resulted in planning objectives based on the following three criteria: diversity; coherence; and continuity. Diversity refers to the diversity of landscape components as an expression of the relationships between (and use and abiotic features; coherence refers to coherence among landscape components as an expression of the relationships between sites hydrology, ecology and infrastructure); continuity refers to temporal relationships of land use and spatial arrangement from the past to the future. These three criteria are interrelated and inseparable. The need for ecological quality as well as aesthetic quality within the rural landscape is seen as a step forward in cultural development. To make EU regulations based on planning objectives seems premature at present. A checklist was established based on the criteria mentioned and was formulated in such a way as to compare an organic farm with a conventional farm in the same landscape unit. The checklist was implemented on organic and adjacent conventional farms in nine regions of Europe. In this article a large farm was considered iir the Dehesa landscape in Andalusia and small farms were considered in the fringe of Lisboa, in the Netherlands and on Crete. The two sets of criteria proved able to include all the arguments named during the evaluation of the contribution of organic farms to landscape quality. (C) 2000 Elsevier Science B.V. All rights reserved.

Kuiper, J. (2000). "A checklist approach to evaluate the contribution of organic farms to landscape quality." Agriculture, Ecosystems & Environment **77**(1-2): 143-156.

http://www.sciencedirect.com/science/article/B6T3Y-3Y21TSP-D/2/600a32f07a0ebf302ec171de342cd5ef
http://www.botanischergarten.ch/Organic/Kuiper-Checklist-Landscape-2000.pdf

Criteria need to be developed to evaluate the cultural environment of European rural landscapes. The goal is to evaluate and encourage the contribution of organic farming to sustainable landscape quality.Two sets of criteria were used to evaluate the quality of the cultural environment, non-expert and expert values. The non-expert values consisted of criteria for the appreciation of the present local landscape by users and inhabitants. These criteria were derived from psychological principles (Coeterier, 1996).The expert values for landscape assessment were derived from physiognomy, geography and landscape architecture. These criteria require specialized knowledge essential in understanding the cultural history of at least the regional landscape and in landscape planning. The criteria were derived from a reflection of landscape plans at different scale levels (Kuiper, 1998). This reflection resulted in planning objectives based on the following three criteria:

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Levin, G. (2007). "Relationships between Danish organic farming and landscape composition." Agriculture Ecosystems & Environment **120**(2-4): 330-344.

<Go to ISI>://000244766400025

This article presents an investigation of relationships between organic farming and landscape composition in Denmark. Landscape composition was analysed in terms of density of uncultivated landscape elements (I), number of land uses per hectare (II), diversity of land use (III) and mean field size (IV). Two analytical approaches were used. The first was based on an examination of the national agricultural registers for 1998, 2001 and 2004. The second approach used aerial photo interpretation for an analysis of 72 conventional and 40 organic farms within three sample areas for 1982, 1995 and 2002. The national analysis indicated that organic farming has a direct effect on landscape composition. In 2001, organic farms were characterised by a higher number of land uses per ha, a higher land use diversity and smaller mean field sizes. From 1998 to 2004, conversion to organic farming was related to an increasing number of land uses per ha, increasing land-use diversity and decreasing mean field sizes. Relationships between organic farming and landscape composition were independent of variations in regional location, farm size or farm size change. At the level of sample areas, a significant relationship between organic farming and landscape composition was only found for densities of small biotopes. However, when differences in farm size and physical geographical conditions between conventional and organic farms were taken into account, several significant differences in landscape composition were clarified in two of the three sample areas. Furthermore, changes in landscape composition following conversion to organic farming were largely biased by the characteristics of the sample areas. Thus, in contrast to the national level, the sample area study indicated that differences in landscape composition between organic and conventional farms were not a direct implication of organic farming practices, but were related to variations within other parameters and to the location of organically farmed land. (c) 2006 Elsevier B.V. All rights reserved.

MacNaeidhe, F. S. and N. Culleton (2000). The application of parameters designed to measure nature conservation and landscape development on Irish farms.

Research has not been previously carried out in Ireland on methods of measuring nature conversation and landscape development on Irish farms. Parameters for measuring the development and improvement of farm landscapes in the EU were applied on two organic farms and two conventional farms to test their suitability for measuring nature and landscape development under Irish conditions. In all 86 parameters were evaluated. All the parameters were applied successfully. Some were more useful than others in this investigation but all were retained so that all the situations which influence nature and landscape in Ireland could be covered. Application of the parameters showed that organic farming has an overall positive effect on landscape and nature production on farms and has no negative effects. Conventional farming can have some positive environmental effects but has neutral or negative effects in most cases. The results show that the methodology used in this paper provide a suitable prototype for measuring landscape development on Irish farms. (C) 2000 Elsevier Science B.V. All rights reserved.

MacNaeidhe, F. S. and N. Culleton (2000). "The application of parameters designed to measure nature conservation and landscape development on Irish farms." Agriculture, Ecosystems & Environment **77**(1-2): 65-78.

http://www.sciencedirect.com/science/article/B6T3Y-3Y21TSP-6/2/74711f07b233ef47d8c2cd32fbcc4c45 AND http://www.botanischergarten.ch/Organic/MacNaeidhe-Parameter-Nature-2000.pdf

Research has not been previously carried out in Ireland on methods of measuring nature conversation and landscape development on Irish farms.Parameters for measuring the development and improvement of farm landscapes in the EU were applied on two organic farms and two conventional farms to test their suitability for measuring nature and landscape development under Irish conditions. In all 86 parameters were evaluated. All the parameters were applied successfully. Some were more useful than others in this investigation but all were retained so that all the situations which influence nature and landscape in Ireland could be covered. Application of the parameters showed that organic farming has an overall positive effect on landscape and nature production on farms and has no negative effects. Conventional farming can have some positive environmental effects but has neutral or negative effects in most cases. The results show that the methodology used in this paper provide a suitable prototype for measuring landscape development on Irish farms.

Naveh, Z. (1998). "Ecological and cultural landscape restoration and the cultural evolution towards a post-industrial symbiosis between human society and nature." Restoration Ecology **6**(2): 135-143.

<Go to ISI>://000074270400003

I discuss ecological and cultural restoration within the broader context of the critical transition period from the fossil fuel age to the post-industrial global information age. In this cultural evolutionary process, the restoration of natural and cultural landscapes should play a vital role. For this purpose, it has to be guided by a holistic and transdisciplinary systems approach, aiming ndt only at the organismic but also at the functional and structural restoration of ecological and cultural diversity as total landscape ecodiversity. For the development of suitable restoration strategies, a clear distinction has to be made between different functional classes of natural and cultural solar-powered biosphere and fossil-powered technosphere landscapes, according to their inputs and throughputs of energy and materials, their organisms, their control by natural or human information, their internal self-organization and their regenerative capacities. Not only technosphere landscapes but also intensive agroindustrial landscapes have lost these capacities and are heavily subsidized by fossil energy and chemicals, to the detriment of the environment and human health. They therefore have to be rehabilitated by more sustainable but not less productive agricultural systems based on organic farming. But their natural regenerative capacities can be restored only by regenerative systems, with the help of cultural "neotechnic" information. The promise for an urgently required evolutionary symbiosis between human society and nature in a sustainable post-industrial total human ecosystem lies in the functional integration of such innovative regenerative systems and all natural and cultural biosphere landscapes with healthier and more livable technosphere landscapes. To this goal, ecological and cultural landscape restoration can make an important contribution.

Neumann, V. H., R. Loges and F. Taube (2007). "Does organic farming benefit the diversity and abundance of breeding birds on arable land? Results from the hedge-landscape of Schleswig-Holstein." Berichte Uber Landwirtschaft **85**(2): 272-299.

<Go to ISI>://000250324800007

A two-year comparative study of breeding birds on conventionally and organically managed arable fields was carried out in the hedge-landscape of Schleswig-Holstein (northern Germany). Birds were recorded on 40 pairs of fields, which differed in the type of farming they were used for (organic/conventional), but were comparable in terms of other parameters known to influence the presence of bird species (area size, vertical boundary structures, relief). The bird species most strongly affected by the type of farming was the skylark (Alauda arvensis), which was significantly more abundant in the organic fields than it was in the conventional fields. The organically managed fields were characterized by the abundance of skylarks being constant during the breeding time from April to July. On the conventional fields, however, the density of skylarks decreased in the course of the first breeding period. On average over both years, pheasants (Phasianus colchicus) were more abundant on the organically managed fields. Yellow wagtails (Motacilla flava), on the other hand, were recorded as being more abundant on the conventional fields in one of the years. The type of farming did not influence the diversity of species (number of species, Shannon Index) or the number of threatened bird species. With regard to the local risk to the species named, the results suggest that agriculture based on the principles of organic farming might contribute towards protecting the populations of skylarks in comparable landscapes. Studies comparing the breeding success would be necessary in order to verify this conclusion.

Norton, L., P. Johnson, A. Joys, R. Stuart, D. Chamberlain, R. Feber, L. Firbank, W. Manley, M. Wolfe, B. Hart, F. Mathews, D. MacDonald and R. J. Fuller (2009). "Consequences of organic and non-organic farming practices for field, farm and landscape complexity." Agriculture Ecosystems & Environment **129**(1-3): 221-227.

<Go to ISI>://000261964100028 AND http://www.botanischergarten.ch/Integrated/Norton-Consequences-Organic-Non-Organic-2009.pdf

This paper provides a detailed description and analysis of habitat and management differences between 89 pairs of organic and non-organic fields on 161 farms containing arable crops distributed throughout England. Data were derived at different scales ranging from field to

landscape scale using a range of methods including: land manager questionnaires, habitat surveys and the use of large-scale landscape datasets. Organic farms were situated in inherently more diverse landscape types, had smaller field sizes, higher, wider and less gappy hedgerows subject to less frequent management, used rotational practices including grass, were more likely to be mixed farms and did not use artificial fertilisers and pesticides. Organic farms were associated with heterogeneous landscape types. However, even in such landscape types the organic farming system produced greater field and farm complexity than farms employing a non-organic system. The findings of the study point to the importance of organic farming systems for maintaining landscape and local complexity with consequent benefits for biodiversity in arable farming landscapes. (C) 2008 Elsevier B.V. All rights reserved.

Oberg, S., B. Ekbom and R. Bommarco (2007). "Influence of habitat type and surrounding landscape on spider diversity in Swedish agroecosystems." Agriculture Ecosystems & Environment **122**(2): 211-219.

<Go to ISI>://WOS:000247191600008

Lycosid and linyphiid spiders were collected over a full cropping season around Uppsala, Sweden, in eight organic spring sown cereal fields in three different habitat types: field margin, field, and the edge between the two. The sites were located in landscapes with different proportions of non-crops, forest, perennial crops, annual crops, and number and sizes of arable fields. The field margin, compared with the field habitat, was found to be important for the activity density of lycosids, and for the species richness and composition of linyphiids. Landscape parameters were central for the activity density of linyphiids and for the species richness and composition of Lycosidae. A diverse landscape with easy access to perennial crops and forest in addition to field margins will augment both the number of species and individuals of the two spider families. (C) 2007 Elsevier B.V. All rights reserved.

Ockinger, E. and H. G. Smith (2007). "Semi-natural grasslands as population sources for pollinating insects in agricultural landscapes." Journal of Applied Ecology **44**(1 %R doi:10.1111/j.1365-2664.2006.01250.x): 50-59.

http://www.blackwell-synergy.com/doi/abs/10.1111/j.1365-2664.2006.01250.x AND http://www.botanischergarten.ch/Organic/Oekinger-Seminatural-2007.pdf

Summary 1. In intensively farmed agricultural landscapes, many species are confined to very small uncultivated areas such as field margins. However, it has been suggested that these small habitat elements cannot support viable populations of all the species observed there. Instead, species richness and abundance in these small habitat fragments may, at least partly, be dependent on dispersal from larger semi-natural grassland fragments. 2. We tested this hypothesis for butterflies and bumble bees in 12 independent landscapes in a region of intense agriculture in southern Sweden. In each landscape we surveyed abundance and species richness in one semi-natural grassland, one linear habitat (uncultivated field margin) adjacent to this (called proximate) and one similar linear habitat (called distant) situated at least 1000 m from the semi-natural grassland patch. 3. Both species richness and density (individuals per unit area) of butterflies and bumble bees were significantly higher in proximate linear habitats than in distant ones. Moreover, butterfly species richness was higher for a given area in grasslands than in any of the linear habitat types. Butterfly density in grasslands did not differ from that in proximate linear habitats but was lower in distant linear habitats. The effect of isolation on density was stronger for less mobile butterfly species. For bumble bees there was no difference in species richness between grasslands and proximate linear habitats. 4. For at least some of the butterfly species even these relatively small fragments of semi-natural grasslands act as population sources from which individuals disperse to the surrounding habitats and thereby contribute to higher densities and species richness in adjacent areas. For bumble bees, it is more likely that the grasslands contain a higher density of nests than the surrounding intensively cultivated landscape, and that the density of foraging bumble bees decreases with increasing distance from the nest. 5. Synthesis and application. Habitat fragmentation and intensified agricultural practices are considered to be a threat against services provided by pollinators. In order to sustain the abundance and diversity of insect pollinators in intensively farmed agricultural landscapes, we suggest that preservation of the remaining semi-natural grasslands or re-creation of flower-rich grasslands is essential. Journal of Applied Ecology (2007) 44, 50-59 doi: 10.1111/j.1365-2664.2006.01250.x

Paoletti, M. G. (1995). BIODIVERSITY, TRADITIONAL LANDSCAPES AND AGROECOSYSTEM MANAGEMENT.

Biological organisms are the basis of life on our planet. Following recent evaluations, only 1/20 to 1/60 of the planet species have yet been described and most of these will be lost if the rate of destruction of our environment continues at the present rate. Most of the terrestrial environment, up to 95%, is affected by human activities, including agriculture, and this terrestrial habitat provides up to 98% of human food on the planet. Sustainable strategies in food production in agriculture improve the existing biodiversity and include the following items: increased porosity of the landscape through natural vegetation, proper management, better use and recycling of organic residues, introduction of integrated farming systems, reduced tillage, rotation, biological control, increased number of biota involved in human foodwebs. Attention must be paid to non-conventional food such as insects and other terrestrial invertebrates in Western countries. Such microlivestock, like the case of palm weevils in Papua New Guinea, can offer a model of sustainable use of rain forests in which most of the diversity on the planet represented by insects is concentrated.

Paoletti, M. G. (1995). "BIODIVERSITY, TRADITIONAL LANDSCAPES AND AGROECOSYSTEM MANAGEMENT." Landscape and Urban Planning **31**(1-3): 117-128.

<Go to ISI>://WOS:A1995QL69600011

Biological organisms are the basis of life on our planet. Following recent evaluations, only 1/20 to 1/60 of the planet species have yet been described and most of these will be lost if the rate of destruction of our environment continues at the present rate. Most of the terrestrial environment, up to 95%, is affected by human activities, including agriculture, and this terrestrial habitat provides up to 98% of human food on the planet. Sustainable strategies in food production in agriculture improve the existing biodiversity and include the following items: increased porosity of the landscape through natural vegetation, proper management, better use and recycling of organic residues, introduction of integrated farming systems, reduced tillage, rotation, biological control, increased number of biota involved in human foodwebs. Attention must be paid to non-conventional food such as insects and other terrestrial invertebrates in Western countries. Such microlivestock, like the case of palm weevils in Papua New Guinea, can offer a model of sustainable use of rain forests in which most of the diversity on the planet represented by insects is concentrated.

Paoletti, M. G. and D. Sommaggio (1996). "Biodiversity indicators for sustainability. Assessment of rural landscapes." Bioindicator Systems for Soil Pollution **10**: 123-140.

<Go to ISI>://WOS:A1996BH88T00010

Biological organisms are tha base of life on our planet. Following recent evaluations, only 1/20 to 1/60 of our planet's species have yet been described and most of these will be lost if the destruction rate of the environment continues at the actual rate. Most of the terrestrial environment (up to 95%), is affected by human activities including agriculture and the terrestrial habitats provide up to 98% of human food on the planet. Sustainable strategies of food production in agriculture have to improve the existing biodiversity and assist in the following: increased porosity of the landscape through proper management of natural vegetation, better use and recycling of organic residues, introduction of integrated farming systems, reduced tillage, rotation, biological control, increased number of biota involved in human foodwebs. Attention must be paid in western countries to non conventional food, insects and other terrestrial invertebrates, such as microlivestock. In addition, small organisms such as soil invertebrates can offer interesting opportunities to monitor the landscape as a suitable tool to evaluate environmental degradation and pollution and sustainability in general. The species number, abundance, dominance, and foodweb complexity, can offer a basic tool to evaluate the rural landscape and it situation. Examples chosen from our research carried out in Italy include apple orchards, peach orchards and vineyards. Invertebrates such as carabids, isopods, earthworms, seem, for instance, suitable to give sufficiently detailed information.

Pedroli, G. B. M., T. Van Elsen and J. D. Van Mansvelt (2007). "Values of rural landscapes in Europe: inspiration or by-product?" Njas-Wageningen Journal of Life Sciences **54**(4): 431-447.

<Go to ISI>://000246556800009

European landscapes are facing a deep crisis. As a consequence of globalization and the economical change associated with it, traditional functions like production agriculture are becoming less important. After the self-evident but inspired landscapes of numerous generations of peasants, monks and landlords, landscape has now largely become a nameless by-product of the global economy. This paper shows that the key to developing new living landscapes lies in a participatory process of landscape development with respect for their inherent values. Today, even in traditionally small-scale farming systems like organic farming, diverse and sustainable landscapes only develop if they are consciously wanted and when landscape development is integrated into the objectives of farming. The work that is needed to achieve such landscapes we call 'landscape work'. This paper describes a phenomenological approach to identifying landscape values and finding new inspiration for landscape management. It gives examples of the application of this approach in organic farming in Germany. It is concluded that a living, sustainable landscape combines the functional effects of producing economic and social benefits with the intertwined effects of

providing identity and inspiration for getting actively involved in it, in accordance with its dynamic character. Living landscapes will enhance the well being, also of the predominantly urban European population. In other words: landscape works.

Piha, M., J. Tiainen, J. Holopainen and V. Vepsalanen (2007). "Effects of land-use and landscape characteristics on avain disversity and abundance in a boreal agricultural landscape with organic and conventional farms." Biological Conservation **140**(1-2): 50-61.

<Go to ISI>://000250903000006

Organic farming has been shown to be beneficial to many taxa associated with farmland habitats, but its importance in mosaic farmland landscapes is poorly understood. The impacts of organic farming have been suggested to be more pronounced in large-scaled homogeneous landscapes than in more heterogeneous mosaic ones, but studies conducted in wider landscape scale have remained scarce. We studied the effects of organic farming, landscape structure and agricultural land-use on field-dwelling farmland birds (14 spp.) at the species and assemblage level in a boreal farmland mosaic landscape (arable area ca. 20 km(2)), where organic farming comprises ca. 10% of the arable area. The analysis was conducted in a landscape scale using spatial regression methodology that incorporates spatial autocorrelation into models. Landscape structure and agricultural land-use were the principal determinants of the bird assemblage, whereas organic farming was favourable only to skylark and lapwing, but not to overall bird density, species richness, diversity or biomass. The species differed significantly in their habitat associations; however, agricultural grasslands strongly and positively determined the majority of the studied variables describing the bird assemblage. Since landscape structure and crop types are not necessarily included in organic regimes, we propose that considerable attention should be paid to make various crop and landscape types represented in organic regimes, particularly in mosaic landscapes. (C) 2007 Elsevier Ltd. All rights reserved.

Purtauf, T., I. Roschewitz, J. Dauber, C. Thies, T. Tscharntke and V. Wolters (2005). "Landscape context of organic and conventional farms: Influences on carabid beetle diversity." Agriculture Ecosystems & Environment **108**(2): 165-174.

<Go to ISI>://000229486400007

Carabid species richness and density were studied in 12 pairs of organic versus conventional wheat fields located along a gradient of landscape complexity (quantified as percent cover of grassland, which was correlated with habitat-type diversity). The relative impact of local and landscape features was analyzed by comparing sites with similar landscape context but different management systems using pitfall traps. Organic and conventional management did not differ with respect to species richness and activity density. Seven species were more abundant under organic management, and eight species were more abundant under conventional management. The effect of landscape complexity was independent of management system. Species richness increased with percent cover of grassland in the surrounding landscape, and activity density followed the same trend. Hence, surrounding grassland appeared to act as a major source of diversity for farmland carabids. In particular, the activity density of spring breeders on organic fields benefited from the increased availability of overwintering habitats in their close surrounding. It was concluded that landscape features were much more important than organic farming management for enhancement of local biodiversity and should thus be considered in agri -environment schemes. (c) 2005 Elsevier B.V. All rights reserved.

Robinson, R. A., J. D. Wilson and H. Q. P. Crick (2001). "The importance of arable habitat for farmland birds in grassland landscapes." Journal of Applied Ecology **38**(5): 1059-1069.

<Go to ISI>://000171692900014 AND http://www.botanischergarten.ch/Organic/Robinson-Arable-Habitat-2001.pdf

1. Over the last 25 years, populations of seed-eating birds have declined severely over most of western Europe. Local extinctions have occurred in grassland-dominated areas in western Britain, which may be influenced by loss in habitat diversity and a decline in the amount of arable cultivation. 2. We used the large-scale British Breeding Bird Survey of 1998 to investigate the importance of arable habitat within grassland landscapes for 11 common seed-eating birds and four similar sized insectivores. Generalized linear models were used to model the number of birds recorded in agricultural habitat within survey squares as a function of the amount of arable habitat present. 3. Numbers of grey partridge Perdix perdix, skylark Alauda arvensis, tree sparrow Passer montanus', corn Miliaria calandra and reed buntings Emberiza schoeniclus, yellowhammer Emberiza citrinella and whitethroat Sylvia communis increased with the amount of arable habitat present in a survey square; the numbers of house sparrow Passer domesticus, four finch species., dunnock Prunella modularis, robin Erithacus rubecula and blackcap Sylvia atricapilla did not. 4. The positive association between numbers of some species and arable habitat within 1-km squares was strongest where arable habitat was rare in the surrounding area, and weakest or even reversed when arable habitat was common. These results demonstrate the scale-dependence of bird-habitat associations in agricultural landscapes, only demonstrable where data are available

at fine grain over large geographical areas. 5. These results support the hypothesis that range contractions (i.e. local extinctions) of some granivorous species have occurred because of contraction in arable cultivation. The loss of arable habitat where it is scarce may be causing declines in some areas, even though intensification of arable management is thought to be the main cause of declines elsewhere. Agri-environment schemes may need to vary between regions, for example to encourage arable cultivation in pastoral areas.

Roschewitz, I., D. Gabriel, T. Tscharntke and C. Thies (2005). "The effects of landscape complexity on arable weed species diversity in organic and conventional farming." Journal of Applied Ecology **42**(5): 873-882.

<Go to ISI>://000232143300011

1. There is growing concern about declining species diversity in agro-ecosystems caused by agricultural intensification at the field and landscape scales. Species diversity of arable weeds is classically related to local abiotic factors and resource conditions. It is believed to be enhanced by organic farming but the surrounding landscape may also be important. 2. This study assessed the ruderal vegetation, seed bank and seed rain in 24 winter wheat fields to examine the relative importance of organic vs. conventional farming and landscape complexity for weed species diversity. Diversity was partitioned into its additive components: alpha, beta and gamma diversity. Percentage arable land in a circular landscape sector of 1-km radius around each study site was used as an indicator of landscape complexity. 3. Weed species diversity in the vegetation, seed rain and seed bank was higher in organic than in conventional fields. Increasing landscape complexity enhanced species diversity more strongly in the vegetation of conventional than organic fields, to the extent that diversity was similar in both farming systems when the landscape was complex. Species diversity of the seed bank was increased by landscape complexity irrespective of farming system. 4. Overall diversity was largely determined by the high heterogeneity between and within the fields (beta diversity). Only in very few cases could higher weed species diversity in complex landscapes and/or organic farming be related to species dependence on landscape or farming system. 5. Synthesis and applications. Local weed species diversity was influenced by both landscape complexity and farming system. Species diversity under organic farming systems was clearly higher in simple landscapes. Conventional vegetation reached similar diversity levels when the surrounding landscape was complex through the presence of refugia for weed populations. Consequently, agri-environment schemes designed to preserve and enhance biodiversity should not only consider the management of single fields but also of the surrounding landscape.

Roschewitz, I., M. Hucker, T. Tscharntke and C. Thies (2005). The influence of landscape context and farming practices on parasitism of cereal aphids.

Agri-environmental schemes in Europe aim to support biodiversity and ecological functions in agroecosystems, which are related to both farming practices and landscape context. Here, we analysed the relative importance of farming practices and landscape context on an important ecosystem service, the naturally occurring biological pest control. In a 3-years study, we investigated cereal aphids and their mortality due to parasitism in 24 paired winter wheat fields (i.e., one organic and one conventional field close to each other). The field pairs were located in 12 landscapes differing in landscape complexity, simple landscapes with high percentage of arable land (similar to 80%), and complex landscapes with lower percentage of arable land (similar to 50%) and high proportions of semi-natural habitats. Arable land (%) was used as simple predictor of landscape complexity, as it was closely related with other landscape metrics like habitat-type diversity. Aphid population densities varied considerably between the 3 years and the 12 different landscapes. Organic farming was related to lower abundance of cereal aphids at the time of wheat flowering, but not to higher parasitism. At wheat ripening, complex landscapes were related to higher parasitism than simple landscapes, presumably due to more overwintering sites, alternative hosts and nectar sources for parasitoids. However, aphid population densities were also higher in complex landscapes, presumably due to the high availability of winter hosts for these host-alternating species. In a geographical scale analysis, we tested the relative importance of landscape complexity at 5 spatial scales (1-3 km radius around the study sites). Parasitoids responded to landscape complexity at spatial scales of 1-2 km, whereas aphid densities responded to landscape complexity at all spatial scales, indicating a trophic level-specific perception of the surrounding landscape. We conclude that complex landscapes with low percentage of arable land appeared to enhance parasitism, but also the host-alternating aphids, so overall effects of landscape complexity on cereal aphid control appear to be ambivalent.

Roschewitz, I., M. Hucker, T. Tscharntke and C. Thies (2005). "The influence of landscape context and farming practices on parasitism of cereal aphids." Agriculture Ecosystems & Environment **108**(3): 218-227.

<Go to ISI>://WOS:000229684400005

Agri-environmental schemes in Europe aim to support biodiversity and ecological functions in agroecosystems, which are related to both farming practices and landscape context. Here, we analysed the relative importance of farming practices and landscape context on an

important ecosystem service, the naturally occurring biological pest control. In a 3-years study, we investigated cereal aphids and their mortality due to parasitism in 24 paired winter wheat fields (i.e., one organic and one conventional field close to each other). The field pairs were located in 12 landscapes differing in landscape complexity, simple landscapes with high percentage of arable land (similar to 80%), and complex landscapes with lower percentage of arable land (similar to 50%) and high proportions of semi-natural habitats. Arable land (%) was used as simple predictor of landscape complexity, as it was closely related with other landscape metrics like habitat-type diversity. Aphid population densities varied considerably between the 3 years and the 12 different landscapes. Organic farming was related to lower abundance of cereal aphids at the time of wheat flowering, but not to higher parasitism. At wheat ripening, complex landscapes were related to higher parasitism than simple landscapes, presumably due to more overwintering sites, alternative hosts and nectar sources for parasitoids. However, aphid population densities were also higher in complex landscapes, presumably due to the high availability of winter hosts for these host-alternating species. In a geographical scale analysis, we tested the relative importance of landscape complexity at 5 spatial scales (1-3 km radius around the study sites). Parasitoids responded to landscape complexity at spatial scales of 1-2 km, whereas aphid densities responded to landscape complexity at all spatial scales, indicating a trophic level-specific perception of the surrounding landscape. We conclude that complex landscapes with low percentage of arable land appeared to enhance parasitism, but also the host-alternating aphids, so overall effects of landscape complexity on cereal aphid control appear to be ambivalent. (c) 2005 Elsevier B.V. All rights reserved.

Rossi, R. and D. Nota (2000). "Nature and landscape production potentials of organic types of agriculture: a check of evaluation criteria and parameters in two Tuscan farm-landscapes." Agriculture, Ecosystems & Environment **77**(1-2): 53-64.

http://www.sciencedirect.com/science/article/B6T3Y-3Y21TSP-5/2/0117ef4fafec0b9550bbc55e09639ab5

Criteria and parameters for the evaluation of sound rural landscapes presented in the list worked out in the EU-concerted action ‘The nature and landscape production potentials of sustainable/organic types of agriculture’ (third version, November 1995) are checked in two Tuscan organic farms. The first farm is located in the landscape system of the Coastal Plains in the Province of Grosseto, southern Tuscany. The second one is located in the landscape system of the Pliocene Hills in the Province of Florence, central Tuscany. Referring to the ‘Checklist for sustainable landscape management’ as presented by Stobbelaar and Van Mansvelt (1994), some comments are given on the criteria and parameters proposed and on the method used for computing values in the evaluation (see Tellarini and Caporali, 2000). The evaluation that results confirms that organic farms in both areas add a considerable number of values to the surrounding landscape, ranging from a clean environment, a diverse agro-ecosystem, multiple social and economic functions and a coherently diversified landscape.

Rundlof, M., J. Bengtsson and H. G. Smith (2008). "Local and landscape effects of organic farming on butterfly species richness and abundance." Journal of Applied Ecology **45**(3): 813-820.

<Go to ISI>://000255464600009

1. Agri-environmental schemes (AES) are commonly adopted in Europe to reduce the loss of farmland biodiversity. These schemes have, however, been criticized as not fulfilling this goal, partly because their effectiveness is thought to differ depending on external factors such as landscape heterogeneity, the focal organism and scale of application. 2. We used one AES, organic farming, as a landscape-scale experiment to test whether its effect on butterflies depends on the spatial scale at which it is applied. Our study system consisted of organically and conventionally managed fields within eight pairs of matched landscapes, differing in the proportion of land under organic management at the landscape scale. Butterflies and their nectar and host-plant resources were surveyed along the fields and adjacent field borders. 3. Butterfly species richness and abundance were significantly increased by organic farming at the local scale. However, local butterfly species richness was also positively affected by a large proportion of organic farming in the surrounding landscape, independent of the local farming practice. Local and landscape farming practices interacted such that the farming practice within fields had a larger effect on butterfly abundance if surrounded by conventionally rather than organically managed fields. These results could only partly be explained by variation in local availability of nectar and host-plant resources. 4. The total observed species richness (gamma-diversity) was higher in organically managed landscapes, mainly because of higher within-field diversity (alpha-diversity), whereas the between-field diversity (beta-diversity) tended to be similar in both landscape types. 5. Synthesis and applications. Butterflies were positively affected by organic farming at a local scale, but the amount of organic farming in the surrounding landscape had either an additive (species richness) or interactive (abundance) effect. Therefore, the spatial distribution of AES must be taken into account to maximize their potential to increase farmland biodiversity. We have shown that organic farming affected butterfly species richness on nearby conventionally managed land. This suggests a landscape effect of organic farming that may indicate a wider benefit of AES for biodiversity conservation.

Rundlof, M., H. Nilsson and H. G. Smith (2008). "Interacting effects of farming practice and landscape context on bumblebees." Biological Conservation **141**(2): 417-426.

<Go to ISI>://000254599900009

Organic farming has been suggested to counteract declines in farmland biodiversity, but comparisons to conventional farming have produced variable outcomes. To examine whether this is due to the landscape context farms are situated in and traits of the studied organisms, we surveyed bumble bees in cereal field borders and margins at 12 pairs of matched organic and conventional farms, with half the pairs located in heterogeneous farmland and the remaining in homogeneous plains. Species richness and abundance of bumble bees were significantly positively related to both organic farming and landscape heterogeneity. However, there was an interaction effect between farming practice and landscape context so that species richness and abundance were only significantly higher on organic farms in homogeneous landscapes. The higher abundance of bumble bees on organic farms was partly related to higher flower abundance on these sites. The effect of landscape context on bumble bee abundance was stronger for species with medium sized colonies than for those with smaller and larger colony sizes. These patterns may reflect that species with medium sized foraging ranges are most affected by fragmentation of foraging habitat, because colony size reflects the spatial scale at which bumble bees utilize resources. We conclude that both organic farming and landscape heterogeneity can be used to increase bumblebee species richness and abundance, but that organic farming has a larger effect in homogeneous landscapes and landscape heterogeneity a larger effect on conventional farms. The effects differed between species, suggesting that a single prescription to increase pollinator abundance may not be valid. (C) 2007 Elsevier Ltd. All rights reserved.

Rundlof, M. and H. G. Smith (2006). "The effect of organic farming on butterfly diversity depends on landscape context." Journal of Applied Ecology **43**(6): 1121-1127.

<Go to ISI>://000241677100008

The recent dramatic decline in farmland biodiversity is often attributed to agricultural intensification and structural changes in the agricultural landscape. One suggested farm practice seen to benefit biodiversity and reverse declines is organic farming. Because organic farming is viewed as a more sustainable form of agriculture it is currently subsidized by European agri-environment schemes. However, the efficiency of agri-environment schemes to preserve biodiversity has recently been questioned, partly because their uptake has been highest in extensively farmed more heterogeneous landscapes. We investigated the effect of farming practice on butterfly species richness and abundance along cereal field headlands and margins on 12 matched pairs of organic and conventional farms in contrasting landscapes (homogeneous and heterogeneous landscape diversity). Both organic farming and landscape heterogeneity significantly increased butterfly species richness and abundance. There was also a significant interaction between farming practice and landscape heterogeneity, because organic farming only significantly increased butterfly species richness and abundance in homogeneous rather than heterogeneous landscapes. An analysis of the distribution of organic farming in Sweden in relation to productivity of the arable land (yield of spring barley, kg ha(-1)) indicated that the distribution of organic farms was skewed towards extensively farmed agricultural areas. Synthesis and applications. The species richness and abundance of butterflies can be enhanced by actions aimed at both promoting organic farming and increasing landscape heterogeneity. However, the beneficial effect of organic farming was only evident in intensively farmed homogeneous landscapes. Currently, the majority of organic arable land in Sweden is located in heterogeneous landscapes where changing the type of farming practice adds little to the existing biodiversity. We therefore propose that the interaction between landscape heterogeneity and farming practice must be considered when promoting farmland biodiversity, for example in Europe by developing context-based agri-environment schemes to increase the amount of organic farming in intensively farmed landscapes. We also propose that in homogeneous agricultural landscapes, organic farming could be used as a more efficient tool to restore landscape heterogeneity if the creation of semi-natural landscape elements was mandatory in the regulations associated with organic agri-environment schemes.

Schellhorn, N. A., S. Macfadyen, F. Bianchi, D. G. Williams and M. P. Zalucki (2008). "Managing ecosystem services in broadacre landscapes: what are the appropriate spatial scales?" Australian Journal of Experimental Agriculture **48**(12): 1549-1559.

<Go to ISI>://WOS:000260640500009 AND http://www.botanischergarten.ch/Organic/Schellhorn-Managing-Ecosystem-Services-2008.pdf

Over the past 200 years agriculture has expanded throughout Australia. The culmination of clearing and cultivating land at the farm scale has resulted in highly modified landscapes and a perceived loss of ecosystem services from pest control and pollination. We examine the literature: (i) to identify the appropriate spatial scale for managing pests, natural enemies and pollinators; and (ii) for evidence that farm-scale changes (due to agricultural intensification) across a landscape have resulted in a tipping point favouring pests and hindering pollinators.

Although there is limited information to draw firm conclusions, the evidence suggests that actions undertaken on individual farms have an impact both on their neighbours and regionally, and that the culmination of these actions can lead to changes in population dynamics of pests, natural enemies and pollinators. For major pest species, there is reasonable evidence that grain growers may benefit from improved management and higher yields by implementing area-wide pest management strategies on a landscape scale in collaboration with growers of other crops that also share these pests. As yet, for natural enemies and pollinators there is little direct evidence that similar area-wide initiatives will have a greater effect than management strategies aimed at the field and farm level. Managing pests, natural enemies and pollinators beyond the scale of the field or farm is technically and socially challenging and will required a well defined research agenda, as well as compromise, balance and trading among stakeholders. We highlight critical knowledge gaps and suggest approaches for designing and managing landscapes for ecosystem services.

Schmidt, M. H., I. Roschewitz, C. Thies and T. Tscharntke (2005). "Differential effects of landscape and management on diversity and density of ground-dwelling farmland spiders." Journal of Applied Ecology **42**(2): 281-287.

<Go to ISI>://000228396600010

1. The distribution and abundance of animals are influenced by factors at both local and wider landscape scales. Natural enemies of pests in arable fields often immigrate from the surrounding landscape, and are also influenced by local management practices. Thus, landscape diversification and farming methods may both enhance farmland biodiversity, but their relative roles and possible interactions have been little explored. 2. The relationships of ground-dwelling spiders (Araneae) to landscape features and to organic agriculture were studied in 12 pairs of organic vs. conventional fields of winter wheat Triticum aestivum along a gradient of landscape complexity. 3. High percentages of non-crop habitats in the landscape increased local species richness of spiders from 12 to 20 species, irrespective of local management. This indicates that larger species pools are sustained in complex landscapes, where there is higher availability of refuge and overwintering habitats. 4. Organic agriculture did not increase the number of spider species, but enhanced spider density by 62%. Additionally, spider density was positively related to the percentage of non-crop habitats in the surrounding landscape, but only in conventional fields. 5. Synthesis and applications. The species richness of ground-dwelling spiders in crop fields was linked to large-scale landscape complexity, while spider densities responded to local management practices. Organic agriculture benefits farmland spiders and augments the numbers of predatory spiders, thereby contributing to pest control. However, measures to conserve species richness must also take landscape-scale factors into account. Complex landscapes including perennial non-crop habitats should be preserved or restored to achieve high levels of spider diversity.

Singh, K., K. G. Saxena, R. K. Maikhuri and K. S. Rao (2008). "Characterizing land-use diversity in village landscapes for sustainable mountain development: a case study from Indian Himalaya." Environmentalist **28**(4): doi:10.1007/s10669-008-9164-6.

<Go to ISI>://BIOSIS:PREV200900014546

This study aimed to analyze the ecological, socio-economic and policy implications of land-use diversity in a traditional village landscape (900-1,000 m amsl.) in the Garhwal region of Indian Himalaya. The village landscape was differentiated into three major land-use types viz., forests, settled agriculture and shifting agriculture. Settled agriculture was further differentiated into four agroecosystem types viz., homegarden system (HGS), rainfed agroforestry system (RAS), rainfed crop system (RCS) and irrigated crop system (ICS), and shifting agriculture system (SAS) was differentiated into different stages of a 4-year long cropping phase and a 7-year long fallow phase, and forests into Community Forests (CF) and Reserve Forests (RF). HGS is the most productive agroecosystem, with soil organic carbon and nutrient concentrations significantly higher than all other forest/agricultural land-uses. Farmers capitalize upon crop diversity to cope with the risks and uncertainties of a monsoon climate and spatial variability in ecological factors influencing productivity. The SAS, a land-use adopted as a means of acquiring inheritable rights over larger land holdings provided in the policies during the 1890s, is less efficient in terms of land productivity than the traditional RAS and HGS but is maintained for its high labour productivity coupled with availability of high-quality fuelwood from fallow vegetation. Dominance of fodder trees in the RAS seems to derive from policies causing shortage of fodder available from forests. Cultural norms have favoured equity by allowing hiring of labour only from within the village community and income from non-timber forest products only to the weaker section of the society. Conversion of rainfed to irrigated cropping, a change facilitated by the government, improves agricultural productivity but also increases pressure on forests due to higher rates of farmyard manure input to the irrigated crops. Existing forest management systems are not effective in maintenance of a large basal area in forests together with high levels of species richness, soil fertility and resistance to invasive alien species Lantana camara. Farmers have to spend huge amount of labour and time in producing manure, managing livestock and other subsidiary farm activities. Interlinkages among agriculture, forests and rural economy suggest a need of replacing the present policies of treating agricultural development, forest conservation and economic development as independent sectors by an integrated sustainable development policy. The policy should promote technological and institutional innovations enabling parallel improvements in agricultural productivity and functions of forest ecosystems.

Sinha, B., T. Hadauria, P. S. Ramakrishnan, K. G. Saxena and R. K. Maikhuri (2003). "Impact of landscape modification on earthworm diversity and abundance in the Hariyali sacred landscape, Garhwal Himalaya." Pedobiologia **47**(4): 357-370.

<Go to ISI>://WOS:000185204300007

This study in the Hariyali sacred landscape (Garhwal Himalaya, India) was undertaken to evaluate the impact of ecosystem type, quality of organic inputs and water management on diversity and abundance of earthworms. A total of seven species viz., moniligastrid Drawida nepalensis (Michaelsen), lumbricid Allolobophora parva (Eisen), megascolecid Eutyphoeus sp. (near Eutyphoeus pharpingianus), octochaetid Octochaetona beatrix (Beddard), megascolecid Periyonx sp., octochaetid Lennogaster pusillus (Stephenson) and megascolecid Amynthas corticis (Baird), belonging to four families were found in the landscape. D. nepalensis had the widest distribution. Eutyphoeus sp., A. parva and Periyonx sp. were found only in forest ecosystems and L. pusillus and A. corticis only in agroecosystems. Total density of earthworms was highest under pine forest and species richness was greatest under the broad-leaved forest. Density and biomass of D, nepalensis and L. pusillus varied significantly between different years of cropping under rainfed agriculture receiving oak based or pine based organic inputs. Forest ecosystems had a mixed population of endemic and exotic species, whereas in agroecosystems endemics dominated. Epigeic species were the dominant functional group under broad-leaved forest and pine - broad-leaved mixed forests, whilst endogeic species were dominant under the pine forest. Irrigated agroecosystems receiving oak-based as well as pine-based organic inputs supported only endogeics, whereas both endogeic and epi-anecic species were observed in rainfed agroecosystems. This suggests that distribution of functional groups is determined by land use practices. Eutyphoeus sp. was the only species that showed a significant positive correlation with moisture and a negative correlation with pH and organic carbon. D. nepalensis and A. parva occurred under forest ecosystems and showed a significant positive correlation with lignin and ON ratio, and a negative correlation with litter polyphenol concentration. Soil parameters and FYM-characteristics did not show any significant correlation with species occurring under agroecosystems. D. nepalensis, which is an endogeic but with a wide ecological amplitude, and the epigeic A. parva, present in large numbers in pine forest, are the two species which could be promoted for inoculation into litter-FYM based organic residue management pits.

Stobbelaar, D. J., J. Kuiper, J. D. van Mansvelt and E. Kabourakis (2000). "Landscape quality on organic farms in the Messara valley, Crete: Organic farms as components in the landscape." Agriculture, Ecosystems & Environment **77**(1-2): 79-93.

http://www.sciencedirect.com/science/article/B6T3Y-3Y21TSP-7/2/2dc1680ee31269f18c5f7b854bd6a06e AND http://www.botanischergarten.ch/Organic/Stobbelaar-Landscape-Evaluation-2000.pdf

Two organic farms were evaluated on their landscape value in a broad perspective and compared with the surrounding non-organic farms. Therefore, a checklist with abiotic, social and cultural criteria was used. Firstly, an overview of the qualities of the Cretan landscape is given, which secondly, gives a framework to determine in how far the farms contribute to the landscape qualities. Thirdly, the scoring of the two described organic farms are compared with each other. This leads to the conclusion that the larger organic farm performs better than the smaller, especially concerning the abiotic environment. The cause of this difference in landscape performance may lie in the different social organisation of the two farms. However, when comparing the two farms with the (conventional) surrounding, both farms perform pretty well.

Stobbelaar, D. J. and J. D. van Mansvelt (2000). "The process of landscape evaluation Introduction to the 2nd special AGEE issue of the concerted action: "The landscape and nature production capacity of organic/sustainable types of agriculture"." Agriculture Ecosystems & Environment **77**(1-2): 1-15.

<Go to ISI>://000084356400001

In an EU concerted action a checklist with criteria for the development of sustainable rural landscape was created. The idea of the concerted action was to bring together experts from various disciplines involved in management of the countryside. They represented disciplines from beta, gamma and alpha oriented sciences, ranging form environmentalists over sociologists to cultural geographers. They were all asked to list their (discipline's) criteria and parameters for a sustainable management of the landscape. From all these criteria and parameters a checklist has been established. This checklist is presented in this paper, accompanied by an explanation of its basic concept that draws upon Maslow, its context, its methodology and its use. Finally summaries an presented of the ways the checklist, in various stages of its development, has been used in several European country countrysides. It can be concluded that the checklist is a useful tool for valuing the contribution of farms viz. farming systems to the regional development and the sustainability of the landscape. It was found that organic farms included in the sample of our research often performed rather well in that perspective as compared to the non-organic farms in that region. (C) 2000 Elsevier Science B.V. All rights reserved.

Terra, J. A., J. N. Shaw, D. W. Reeves, R. L. Raper, E. van Santen, E. B. Schwab and P. L. Mask (2006). "Soil management and landscape variability affects field-scale cotton productivity." Soil Science Society of America Journal **70**(1): 98-107.

<Go to ISI>://WOS:000235088200013

A better understanding of interactions between soil management and landscape variability and their effects on cotton (Gossypium hirsutum L.) productivity is needed for precision management. We assessed management practices and landscape variability effects on seed cotton yield in a 9-ha, Alabama field (Typic and Aquic Palendults) during 2001-2003. We hypothesize that landscapes have major effects on cotton productivity, but these effects vary based on management and climate. Treatments were established in replicated strips traversing the landscape in a corn (Zea mays L.)-cotton rotation. Treatments included a conventional system with or without 10 Mg ha(-1) yr(-1) dairy manure (CTmanure or CT), and a conservation system with and without manure (NTmanure or NT). Conventional systems consisted of chisel plowing/disking + in-row subsoiling without cover crops. Conservation systems combined no surface tillage with in-row subsoiling and winter cover crops. A soil survey, topographic survey, and interpolated surfaces of soil electrical conductivity (EC), soil organic carbon (SOC), and surface soil texture were used to delineate five zones using fuzzy k-means clustering. Overall (2001-2003), conservation systems improved cotton yield compared with conventional systems (2710 vs. 2380 kg ha(-1)); neither manure nor treatment X year interactions were significant. The conservation system was more productive than the conventional system in 87% of the cluster X year combinations. Slope, EC, SOC, and clay content were correlated with yield in all treatments. Soil and terrain attributes explained 16 to 64% of yield variation, however, their significance fluctuated between years and treatments. In dry years, factor analyses suggested variables related with soil quality and field-scale water dynamics had greater impacts on CT yields than NT yields. Our results indicate that management zones developed using relatively static soil-landscape data are relatively more suitable for conservation systems, and these zones are affected by soil management. In addition, the impact of NT on yields is most apparent on degraded soils in dry years.

van Mansvelt, J. D., D. J. Stobbelaar and K. Hendriks (1998). "Comparison of landscape features in organic and conventional farming systems." Landscape and Urban Planning **41**(3-4): 209-227.

<Go to ISI>://000075587300008

Four organic (biodynamic) farms coupled with conventional farms from their neighbourhood in The Netherlands, Germany and Sweden, and 3 organic farms and 4 conventional farms from the West Friesean region in The Netherlands were evaluated to compare their impact on landscape diversity. Materials used were soil-, water-, land use- and land-property maps, interviews with the farmers, repeated (several days) visits to the farms, allowing to make temporal transects, photographs and pictures of the farm-couples and their surroundings. Presence of diverse land use types, woody elements (plantings) and visual elements (vertical and horizontal coherence, colours and forms) were analysed. The results show that the diversity of landscapes and farming system was greater in organic farms. It regards to the land-use types, crops, livestock, plantings (hedges, solitary shrubs and trees), flora, sensorial information (more forms, colours, smells, sounds, spatial experiences) and labour (more on-farm processing and more people involved). Also, all forms of coherence were found to be greater in organic farms. In terms of landscape diversity the organic types of agriculture have a good potential for positive contributions to a sustainable agro-landscape management. (C) 1998 Published by Elsevier Science B.V. All rights reserved.

Weibull, A.-C. (2002). "Higher biodiversity in heterogeneous landscapes." Entomologisk Tidskrift **123**(4): 163-165.

<Go to ISI>://BIOSIS:PREV200300240492

Due to changes in agriculture during the last 50 years, biodiversity has been lost, and converting farms to organic has been assumed to be the answer to how this negative trend in species loss can be stopped. This study shows that other factors, like the landscape composition, is more important for diversity than farming system.

Weibull, A. C. and O. Ostman (2003). "Species composition in agroecosystems: The effect of landscape, habitat, and farm management." Basic and Applied Ecology **4**(4): 349-361.

<Go to ISI>://000184879400008

It has been suggested that species richness in agricultural ecosystems depends on both landscape heterogeneity and farm management, but how these factors affect species composition is still poorly understood. In this study, we investigated the species composition of plants, butterflies, and carabid beetles in three different habitats (cereal fields, leys, and semi-natural pastures) in relation to farm management (conventional vs. organic) and landscape complexity at 16 farms in south-eastern Sweden. The farms were divided into eight pairs of one conventional and one organic farm based on land use, location, and landscape features to enable us to separate the effects of landscape features and farm management on species composition. Habitat type explained most of the variation in species composition of butterflies, carabids, and plants. Landscape features in the surrounding landscape explained additional variation, but little relative to habitat, in species composition. The effect of landscape features was larger in the disturbed habitats (cereal fields and ley) than in the more stable semi-natural pastures. Moreover, the effect of landscape features was largest for the most mobile group, butterflies, and least for the sessile plants. The percentage of ley (land temporarily with perennial grass and clover) was the most important landscape feature for butterfly and plant species composition, whereas landscape heterogeneity was the most important landscape feature for carabid species composition. Farm management explained some additional variation in species composition of carabids and butterflies, but it was of minor importance compared to landscape features for species composition of butterflies and plants. We classified the species as common or rare, but for no taxa were common or rare species associated with any landscape feature or farm management.

Westergaard, K. (2006). "The landscape composition of organic and conventional, dairy and crop farms in two different geological regions in Denmark." Agriculture Ecosystems & Environment **117**(1): 63-70.

<Go to ISI>://000241014400008

Landscape structure in rural areas reflects natural preconditions, types of farms present and their structure. However, these factors are often correlated, which blurs their separate effects. In this study, landscape composition was compared between organic and conventional farms, and between crop and dairy farms, situated in two geological regions (ground moraine and outwash plain) in Denmark. The 40 farms included in the study were stratified in eight groups with all combinations of region and farm types. The land units on the farms were typified, the coverage of each type assessed, and farm activities to establish new non-production land units during the last 10 years were registered. Average field size increased with farm size and was larger on crop farms than on dairy farms. Crop and dairy farms differed in coverage of fallow land and building area - land unit types closely linked to the agricultural production, and crop farmers were more active in establishing small plantings than dairy farmers. Conventional and organic farms did not differ in landscape characteristics, in contrast to conclusions of previous studies in Europe. (c) 2006 Elsevier B.V. All rights reserved