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Summarizing key messages of LegumeLINK October 2011

1. Cover crops in general
2. Diverse mixes and productivity
3. Diverse mixes wildlife & environment
4. Practical issues: designing a mixture
5. Messages to policy makers

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1. Key messages to conventional farmers

Cover crops are useful tools in the rotation:

1. Cover crops increase infiltration.
2. (Legume-based) cover crops increase yield .compared to “current” rotational system (by ~5%)
3. This effect is consistent across a number of different crops (wheat, oil seed rape).
4. As a result of this and through decreasing costs for N fertilization economic performance is improved.
5. While establishment costs for cover crops may currently outweigh economic benefits, this changes with rising costs of bagged N.

2. Key messages to (organic) farmers

Diversity is beneficial: productivity & weed control

1. Diverse mixtures show a higher productivity than *monocultures* (biomass, crop cover).
2. A more complex (functionally diverse) mixture shows a higher productivity than currently used ones (biomass).
3. This advantage of the mixture increases over time
4. And the advantage is higher on less fertile soils (low organic matter).
5. This increased biomass is links through to higher yield of the following crop.
6. Mixing species with different properties allows better weed control throughout the season.

3. Further messages to (organic) farmers

Diversity is beneficial: farm wildlife and environment

1. Diverse mixture support more pollinators throughout the season.
2. Diverse mixture also provide a larger food range for other invertebrates ("bird food").
3. Mixtures with higher diversity do not compromise wild plant diversity (i.e. neutral effect).
4. Including slower decomposing species would decrease the risk of nitrogen losses to the environment (leaching, gaseous losses).
5. However, data show that more gaseous losses after different legume species are not significantly different (a non-criterion?).

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4. Messages for designing a mixture

1. Use species together that are functionally complementary (e.g. Crimson clover, lucerne), i.e. consider *functional* diversity rather than *species* diversity.
2. Criteria for species choice include: phenology, residue properties, biomass potential, response to management, response to climate and soil conditions, value for livestock, value for pollinators, etc.
3. We have developed a method for compiling mixtures according to multiple complementarity.
4. Some species shown to be failures (almost) everywhere (i.e. not recommmended): Meadow pea, Winter vetch, Large birdsfoot trefoil.
5. Some species are show marked differences in performance depending on region (Sainfoin).

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5. Key message to policymakers

Carefully chosen mixes provide opportunity to reconcile aims of food security, wildlife conservation and environmental protection.

Agronomic and economic advantages of using diverse cover crops in conventional systems are *currently* not high enough to trigger sufficient private investment.

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