# C1 Innovations in vineyard inter-row greening to increase biodiversity and resilience in vineyard ecosystems

***C1's Project Deliverable Product***

**Guidelines for the establishment of climate- and biodiversity-friendly vineyards**

The following content is an excerpt from the brochure "Sieg, L., Elias, D., Tischew, S. und Kirmer, A. (2025): Wildkräutergassen in Weinbergen der Saale-Unstrut-Weinbauregion – Tipps für die Anlage und Pflege sowie Steckbriefe typischer Pflanzen und Tiere. Brochure as part of the LIFE VineAdapt project. 58 p."

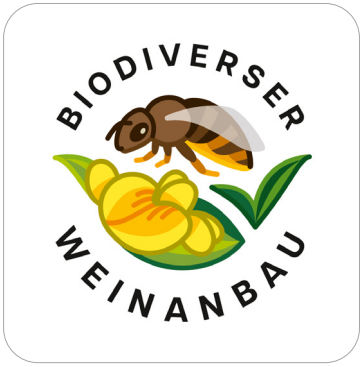
Summary:
A brief introduction to the LIFE VineAdapt project is followed by a presentation of the "Biodiverse Winegrowing" label. Information is given on the establishment and maintenance of wild forb inter-rows in vineyards in the Saale-Unstrut wine-growing region, including a list of recommended species. Finally, contact persons for practical questions are named.

# *The LIFE VineAdapt project*

The project aims to help improve the resilience of vineyard ecosystems to climatic changes. Increasing biodiversity and adapting the management of vineyards are key to this. Eight research and practice partners from Germany, France, Austria and Hungary are working together in the project to optimize vineyard management practices that conserve resources and are adapted to climate change. Further information on the project can be found here: www.life-vineadapt.eu.

# *Label „Biodiverse Winegrowing“*

The **LIFE VineAdapt project** the „Biodiverse Winegrowing“ label, a symbol for more sustainable and biodiversity-friendly wine production. Winegrowers who sow the recommended certified and regionally adapted wild plant mixtures in the vineyard inter-rows can use the label.




The biodiversity vineyards established in this way offer:

- Space for native wild plants
- Habitat for beneficial insects
- Improved erosion prevention
- Liveable countryside

The label provides guidance when buying wines and creates transparency. It can be used on bottle tags or in the internet. By purchasing wines with this label, you are supporting climate and biodiversity-friendly winegrowing. If you are a winegrower and would like to use the (cost-free) label, please contact Dietrich Frank at the Landesweingut Kloster Pforta (E-Mail: **frank@kloster-pforta.de**).


Fotomontage: LKP/Wiesner/Rothkötter

# *Project partners*

## Germany

**Landgesellschaft Sachsen-Anhalt**
Isabel Reuter
reuter.i@lgsa.de
**Anhalt University of Applied Sciences**
Prof. Dr. Anita Kirmer
anita.kirmer@hs-anhalt.de
**Landesweingut Kloster Pforta**
Dietrich Frank
frank@kloster-pforta.de

## France

**Avignon Université – IMBE**
Prof. Dr. Armin Tochoff
armin.tochoff@univ-avignon.fr
**Marrenon – Vignobles en Luberon & Ventoux**
Thomas Combe
thomas.combe@marrenon.com

## Austria

**HBLFA Raumberg-Gumpenstein**
Dr. Wilhelm Graiss
wilhelm.graiss@raumberg-gumpenstein.at
**Steirisches Landesweingut Silberberg**
Karl Menhart
karl.menhart@stmk.gv.at

## Hungary

**ÖMKi - Research Institute of Organic Agriculture**
Dr. Fruzsina Szira
fruzsina.szira@biokutatas.hu

# *Species list for the Saale-Unstrut region*

Various seeding mixtures were tested as part of the project. The findings from the previous **LIFE VineEcoS project** were also used. The selection of species for the seed mixture was a time-consuming process in collaboration with local experts and seed companies. In addition to a very species- and forb-rich basic mixture for the central reservation of the vineyard inter-row, a mixture with more traffic-tolerant species and a higher proportion of grasses was also developed for the wheel tracks.

### Important selection criteria for plant species were

- Occurrence in the natural area of the sown vineyards
- Availability from certified, regional seed propagation of wild plants
- Different lifespans (annual, biennial and perennial)
- High drought tolerance, small size
- Characteristic for habitat types of dry and fresh habitats (habitat types 6110, 6210, 6240, 6510)
- different flower color/shape and flowering periods
- High nectar and pollen supply
- Moderate costs

38 plant species and 19 plant families were selected for the middle section basic mixture (37 forbs, 1 grass). These include 34 perennial plant species. The seed mixture for the wheel tracks contains eight perennial species (6 forbs, 2 grasses).

## Middle section seed mixture

| Scientific species name | Species name | Plant family | Lifespan | Flowering months | Flower color | Nek | Pol |
|---|---|---|---|---|---|---|---|
| *Achillea millefolium* | Common yarrow | Asteraceae | perennial | 6-10 | white | 1 | 2 |
| *Anthemis tinctoria* | Dyer's chamomile | Asteraceae | perennial | 6-9 | yellow | 2 | 2 |
| *Anthericum liliago* | St Bernard's lily | Asparagaceae | perennial | 5-6 | white | 3 | 3 |
| *Anthyllis vulneraria s. l.* | Kidney vetch | Fabaceae | perennial | 5-8 | yellow | 2 | 2 |
| *Campanula rotundifolia* | Harebell | Campanulaceae | perennial | 6-10 | violet | 2 | 2 |
| *Centaurea jacea s. str.* | Meadow knapweed | Asteraceae | perennial | 6-11 | purple | 3 | 2 |
| *Centaurea scabiosa s. str.* | Greater knapweed | Asteraceae | perennial | 7-8 | purple | 3 | 2 |
| *Cichorium intybus* | Chicory | Asteraceae | perennial | 7-10 | light blue | 3 | 3 |
| *Clinopodium vulgare* | Wild basil | Lamiaceae | perennial | 7-9 | purple | 2 | 1 |
| *Consolida regalis* | Field larkspur | Ranunculaceae | annual | 5-8 | blue | 1 | 2 |
| *Dianthus carthusianorum* | Carthusian pink | Caryophyllaceae | perennial | 6-9 | purple | 2 | 1 |
| *Falcaria vulgaris* | Sickleweed | Apiaceae | perennial | 7-9 | white | 2 | 1 |
| *Galium verum agg.* | Yellow bedstraw | Rubiaceae | perennial | 6-9 | yellow | 1 | 1 |
| *Hypericum perforatum* | St. John's wort | Hypericaceae | perennial | 7-8 | yellow | 0 | 3 |
| *Knautia arvensis* | Field scabious | Dipsacaceae | perennial | 7-8 | purple | 1 | 1 |
| *Leucanthemum ircutianum* | Oxeye daisy | Asteraceae | perennial | 6-10 | white w/(yellow) | 2 | 1 |
| *Linaria vulgaris* | Common Toadflax | Scrophulariaceae | perennial | 6-10 | yellow | 2 | 1 |
| *Linum austriacum* | Austrian flax | Linaceae | perennial | 5-7 | light blue | 1 | 1 |
| *Lotus corniculatus* | Common bird's-foot trefoil | Fabaceae | perennial | 6-8 | yellow | 3 | 1 |
| *Malva moschata* | Musk mallow | Malvaceae | perennial | 6-10 | pink | 2 | 1 |
| *Medicago lupulina* | Hop clover | Fabaceae | perennial | 5-10 | yellow | 2 | 2 |
| *Onobrychis arenaria* | Sand sparrow | Fabaceae | perennial | 6-7 | pink | 4 | 4 |
| *Origanum vulgare* | Common dost | Lamiaceae | perennial | 7-9 | pink | 3 | 2 |
| *Papaver rhoeas* | Common poppy | Papaveraceae | annual | 5-7 | red | 0 | 3 |
| *Phleum phleoides* | Boehmer's cat's-tail | Poaceae | perennial | 6-7 | yellow-green | k. A. | k. A. |
| *Plantago lanceolata* | Narrowleaf plantain | Plantaginaceae | perennial | 5-10 | green-brown | 0 | 3 |
| *Plantago media* | Hoary plantain | Plantaginaceae | perennial | 5-9 | green-brown | 0 | 3 |
| *Potentilla argentea* | Silver cinquefoil | Rosaceae | perennial | 6-10 | yellow | 1 | 2 |
| *Ranunculus bulbosus* | Bulbous buttercup | Ranunculaceae | perennial | 5-7 | yellow | 3 | 3 |
| *Reseda lutea* | Yellow mignonette | Resedaceae | biennial | 5-9 | yellow | 2 | 3 |
| *Salvia pratensis* | Meadow sage | Lamiaceae | perennial | 5-8 | violet | 3 | 1 |
| *Sanguisorba minor ssp. minor* | Small burnet | Rosaceae | perennial | 5-8 | dark red | 2 | 2 |
| *Scabiosa ochroleuca* | Yellow scabious | Dipsacaceae | perennial | 7-10 | light yellow | 3 | 2 |
| *Silene nutans* | Nottingham catchfly | Caryophyllaceae | perennial | 5-8 | white | 2 | 1 |
| *Silene vulgaris* | Bladder campion | Caryophyllaceae | perennial | 5-9 | white | 2 | 1 |
| *Stachys recta* | Stiff hedgenettle | Lamiaceae | perennial | 6-10 | light yellow | 3 | 1 |
| *Thymus pulegioides s. l.* | Broad-leaved thyme | Lamiaceae | perennial | 6-10 | purple | 3 | 2 |
| *Trifolium pratense* | Red clover | Fabaceae | perennial | 6-9 | purple | 3 | 3 |

**Nek** (nectar: four classes from none (=0) to very much (=4), Pol (pollen: four classes from none (=0) to very much (=4)

## Wheel track seed mixture

| Scientific species name | Species name | Plant family | Lifespan | Flowering months | Flower color | Nek | Pol |
|---|---|---|---|---|---|---|---|
| *Achillea millefolium* | Common yarrow | Asteraceae | perennial | 6-10 | white | 1 | 2 |
| *Cichorium intybus* | Chicory | Asteraceae | perennial | 7-10 | light blue | 3 | 3 |
| *Festuca brevipila* | Hard fescue | Poaceae | perennial | 5-7 | yellow-green | k. A. | k. A. |
| *Festuca valesiaca* | Volga fescue | Poaceae | perennial | 6-7 | yellow-green | k. A. | k. A. |
| *Lotus corniculatus* | Common bird's-foot trefoil | Fabaceae | perennial | 6-8 | yellow-green | 3 | 1 |
| *Medicago lupulina* | Hop clover | Fabaceae | perennial | 5-10 | yellow-green | 2 | 2 |
| *Plantago lanceolata* | Narrowleaf plantain | Plantaginaceae | perennial | 5-10 | green-brown | 0 | 3 |
| *Trifolium pratense* | Red clover | Fabaceae | perennial | 6-9 | purple | 3 | 3 |

**Information on plant characteristics and properties was taken from the following sources:**


BiolFlor database (2024): https://www.biolflor.de (25/03/2024)

FloraWeb database (2024): https://www.floraweb.de (29/04/2024)

Jäger, E.J., Ebel, F., Hanelt, P., Müller, G.K. (2007): Rothmaler - Exkursionsflora von Deutschland: Krautige Zier- und Nutzpflanzen. Springer. Spektrum.

Müller, F., Ritz, C., Welk, E., Wesche, K. (2021): Rothmaler, Exkursionsflora von Deutschland. Gefäßpflanzen: Grundband. Springer Spektrum.

Pritsch, G. (2018): Bienenweide: 220 Trachtpflanzen erkennen & bewerten. Stuttgart: Kosmos.

Stiftung Naturschutz Schleswig-Holstein (2016): Trachtkalender für Schleswig-Holstein (Heil- und Gewürzpflanzen, Heimische Gehölze und Kletterpflanzen, Heimische Krautige Pflanzen, Nicht heimische Gehölze, Nutzpflanzen, Zierpflanzen).

# *Establishment and maintenance of flowering inter-rows*

The establishment of a species- and flower-rich greening in the vineyard has several advantages. It provides better erosion protection in the vineyard inter-rows and makes them more resistant to summer droughts. The native, site-appropriate wild plants are also valuable sources of nectar and pollen for beneficial insects and pollinators. In addition, a flower-rich vineyard inter-row can also improve the aesthetic value of vineyards and be included in the marketing of wines. The following recommendations for establishing and maintenance should be observed in order to create and maintain this type of greenery, which has many advantages.

## Establishment of a flowering inter-row in the vineyard

**With what?**

- Certified seeds from regional wild plant propagation (**VWW-Regiosaaten®**, **RegioZert®**)
- 30–40 wild plants per mixture for the middle section
- 5–10 traffic-tolerant grasses and forbs for the wheel track
- **Seeding rate**: approx. 1.5 g/m²; mixed with filler (e.g. GMO-free maize meal) to 5-10 g/m² (up to 20 g/m² for hand sowing)

**How?**

- Thorough seedbed preparation if grass-dominated vegetation exists (e.g. by plowing or tilling)
- When sowing open inter-rows, a superficial disturbance shortly before sowing is sufficient
- Surface sowing by hand, with a pneumatic seed drill or a seed drill (coarse seed wheels) → Raise seed coulters and harrows (do not bury seeds, wild plants are light germinators)
- If the middle section and wheel track are sown separately (middle section approx. 70-80 cm, depending on the wheelbase of the equipment used in the vineyard; 35 cm wheel track on each side), the seed box must be divided accordingly
- Rolling recommended (soil closure of the seeds, protection against rinsing)

In the case of frequent traffic, it is advisable to create biodiversity inter-rows alternating with wheel tracks, as wild plants usually take two years to well established. After that, the wheel track can also be converted into biodiversity inter-rows.

**When?**

Preferably from August to October (as soon as the nights get too cold, the seed will no longer germinate); if necessary, sow in spring until the end of March. Problem: Spring and early summer drought; the seed needs 10-14 days of moisture to germinate.


Photo: Lea Sieg

## Use and maintenance

### Development care (1st year after sowing)

- Mulch 2 to 3 times (or mow with removal) at a height of 10-15 cm; April/May, June/July, possibly August (optimal: when the stand of undesirable [**mostly annual**] species is knee-high→ these should not reach seed maturity); if dominant stands of amaranth develop, mow deeper

**Follow-up maintenance (from the 2nd year)**

- Mulching (or mowing with removal) at a height of approx. 10 cm until mid-May on half of the biodiversity inter-rows, second half 4 weeks later, on very productive sites second mowing in August/September (possibly only the May mowing variants, depending on growth)
- Extensive sheep grazing with landscape grazing breeds (e.g. Suffolk, Shropshire, Ouessant) is possible from bud break until the beginning of grape ripening. Neighboring alternative areas (orchards, grassland) are advantageous

## Literature


Elias, D., Schäfer, J., Sieg, L.F., Tischew, S., Kirmer, A.: Wildflower sowings as alternative for conventional inter-row greening in German Vineyards. Under revision.

Freyer, J., Deimer, C., Remkes, B., Eckner, J., Tischew, S., Kirmer, A., Förster, J., Pfau, M., Scheibert, C., Meszner, S. (2020): Weinbau mit biologischer Vielfalt - Ideen zur Umsetzung. 28 S. Broschüre im Rahmen des Projektes LIFE VinEcoS.

Orzessek, D., Kirmer, A., Ballerstein, I. (2022): Die Erhöhung der Biodiversität im Weinbau dargestellt am lehr- und Versuchsweinberg der Hochschule Anhalt. Deutsches Weinbau-Jahrbuch 2022 (73. Vol.): 183–190.

Pfau, M., Förster, J., Schubert, L., Schmid-Egger, C., Tischew, S., Kirmer, A. (2020): Wein und Biodiversität - Ansaat heimischer Wildpflanzen erhöht die Artenvielfalt von Wildbienen im Weinberg. Naturschutz und Landschaftsplanung 52 (11): 530–536.

Schoof, N., Kirmer, A., Luick, R., Tischew, S., Breuer, M., Fischer, F., Müller, S., von Königslöw, V. (2020): Schafe im Weinbau - Chancen und Herausforderungen, praktische Umsetzung und Forschungsziele. Naturschutz und Landschaftsplanung 52 (6): 272–279.

# *Contact for practical questions*

## Germany

**Landesweingut Kloster Pforta**
Dietrich Frank
frank@kloster-pforta.de

Saalberge 73
D-06628 Naumburg

## Austria

**Bio Ernte Steiermark**
Sabrina Dreisiebner-Lanz
sabrina.dreisiebner-lanz@ernte.at

Julius-Strauss-Weg 1
8430 Leibnitz

## France

**Marrenon – Vignobles en Luberon & Ventoux**
Thomas Combe
thomas.combe@marrenon.com

Rue Amédée Giniès
BP 13 La Tour d'Aigues
84120 Pertuis CEDEX

## Hungary

**ÖMKi - Research Institute of Organic Agriculture**
Tamás Miglécz
tamas.miglecz@biokutatas.hu

Miklós tér 1
1033 Budapest


Photo: Landgesellschaft Sachsen-Anhalt mbH

General information on the LIFE VineAdapt project can be found here: **www.life-vineadapt.eu**