

SUPPLEMENTARY DATA

Merot, A., Thiollet-Scholtus, M., Sladeczek, M., Hossard, L., & Smits, N. (2025). Long term analysis of the link between practices and vineyard decline in relation to abiotic factors. *OENO One*, 59(1).
<https://doi.org/10.20870/oeno-one.2025.59.1.8285>



SUPPLEMENTARY DATA

Table S1. Static variables. These 18 variables were collected only once in each plot, generally when the plot was planted or when it entered the plot survey network. The rootstock, initially a categorical variable with 17 levels, was not used under this form (grey boxes) and was replaced by four variables describing its characteristics.

Measured variable	Variable type	Variable unit (numerical) or levels (categorical)	Steps using the variable
Cognac vineyards (https://blog.cognac-expert.com/six-zones-cognac-crus-champagne-bois-borderies-fine/ ; consulted on 24/01/2025)	Categorical	6 levels : « grande champagne », « petite champagne », « borderies », « fins bois », « bons bois », « bois ordinaires »	1, 3
Previous crop	Categorical	4 levels: « empty plot or cereals », « grassland or alfalfa », « grapevine », « other »	1, 3
Topographical location of the plot	Categorical	5 levels: « hillside », « half-hillside », « plain », « lowland », « plateau »	1, 3, 6
Planting density	Numerical	number of plants per hectare	1, 3
Depth of tillable layer	Ordinal	3 levels (1: <20 cm ; 2: 20 - 30 cm ; 3: >30 cm)	1, 3
Soil type	Categorical	See table 1	1, 3, 6
Plot sensitivity to chlorosis	Ordinal	0: symptoms never found, 1: sometimes, 2: often	1, 3
Plot sensitivity to water stress	Ordinal	1: normal, 2: somewhat sensitive, 3: very sensitive	1, 3
Plot sensitivity to water excess	Ordinal	1: normal, 2: somewhat sensitive, 3: very sensitive	1, 3
Possibility of soil tillage after rains	Ordinal	1: easy, 2: somewhat difficult, 3: very difficult)	1, 3
Soil disinfection before planting	Categorical	2 levels: “no”, “yes”	1, 3
Row orientation	Categorical	4 levels: north/south, north-east/south-west, east/west, south-east/north-west	1, 3

SUPPLEMENTARY DATA

Merot, A., Thiollot-Scholtus, M., Sladeczek, M., Hossard, L., & Smits, N. (2025). Long term analysis of the link between practices and vineyard decline in relation to abiotic factors. *OENO One*, 59(1).
<https://doi.org/10.20870/oeno-one.2025.59.1.8285>



Plot orientation	Categorical	9 levels: no slope, north, north-east, east, south-east, south, south-west, west, north-west	1, 3
Plot slope	Numerical	percentage	1, 3
Rootstock	Categorical	17 levels (<i>replaced by the 4 following variables</i>)	1
Vigour conferred by the rootstock	Ordinal	Extracted from the variable rootstock, 4 levels: low, intermediate, high, very high	3, 6
Rootstock sensitivity to water deficit	Ordinal	Extracted from the variable rootstock, 3 levels: low, intermediate, high	3, 6
Rootstock sensitivity to water excess	Ordinal	Extracted from the variable rootstock, 3 levels: low, intermediate, high	3
Rootstock sensitivity to limestone	Numerical	Extracted from the variable rootstock (total limestone %)	3

SUPPLEMENTARY DATA

Merot, A., Thiollet-Scholtus, M., Sladeczek, M., Hossard, L., & Smits, N. (2025). Long term analysis of the link between practices and vineyard decline in relation to abiotic factors. *OENO One*, 59(1).

<https://doi.org/10.20870/oeno-one.2025.59.1.8285>



Table S2. Dynamic variables. These 42 variables were collected each year in each plot and describe all the practices applied in the plot.

Measured variable	Variable type	Variable unit (numerical) or levels (categorical)	Measurement period	Steps using the variable
Soil management				
Soil maintenance (from grower)	Categorical	4 levels: « total weeding », « reduced tillage », « tillage in half of the rows », « grassed ground »	1992-2018	1, 3
Observed soil maintenance	Categorical	4 levels: « total weeding », « reduced tillage », « tillage in half of the rows », « grassed ground »	1990-2018	1, 3
Method used for soil maintenance under vine rows (from grower)	Categorical	3 levels: « weeding », « reduced tillage », « mixed »	1993-2018	1, 3
Observed method for soil maintenance under vine rows	Categorical	4 levels: « weeding », « reduced tillage », « mixed », « mulch »	1999-2018	1, 3
Weed management				
Number of mowings	Numerical	integer	1999-2018	1, 3
Number of full herbicide applications	Numerical	integer	1992-2018	1, 3
Concurrence between grass cover/spontaneous vegetation and vine at veraison in the row	Ordinal	visual estimation from 0 -no concurrence- to 2 – high concurrence	2005-2017	1, 3, 4, 5
Concurrence between grass cover/spontaneous vegetation and vine at veraison in the inter-row	Ordinal	visual estimation from 0 -no concurrence- to 2 – high concurrence	2005-2017	1, 3, 4, 5
Amount of grass cover/spontaneous vegetation in the inter-rows at veraison	Ordinal	visual estimation from 0 -no weed- to 3 –lots of weeds-	1994-2005 and 2005-2018	1, 3, 4, 5
Amount of grass cover/spontaneous vegetation under vine rows at veraison	Ordinal	visual estimation from 0 -no weed- to 3 –lots of weeds-	1996-2018	1, 3

SUPPLEMENTARY DATA

Merot, A., Thiollot-Scholtus, M., Sladeczek, M., Hossard, L., & Smits, N. (2025). Long term analysis of the link between practices and vineyard decline in relation to abiotic factors. *OENO One*, 59(1).

<https://doi.org/10.20870/oeno-one.2025.59.1.8285>



Pruning practices and vegetation management				
Pruning mode: length and tying	Categorical	3 levels: long arcuate pruning, long cut with shoots tied horizontally, short untied cut	1997-2017	1, 3
Pruning mode: height and tying mode	Categorical	4 levels: low vines, half-high vines, high vines with low cords, vines with high cordons and high archs	1997-2017	1, 3
Pruning period during previous winter	Ordinal	4 levels: before January, January, February, March or later	1992-2018	1, 3, 4
Proportion of vine pre-pruned in the plot	Numerical	3 levels: 0%, 50% or 100% of the vines	2000-2018	1, 3, 4, 5
Fate of pruned vine shoots	Categorical	2 levels: « removed from plot », « on site shredding »	1992-2018	1, 3
Vine vigour				
Number of shoot pruning	Numerical	integer	1995-2018	1, 3
Method used for shoot pruning	Categorical	3 levels: manual, mechanical, mixed	2000-2018	1, 3
Method used for sucker removing	Categorical	5 levels: manual, thermal, mechanical, chemical, mixed	2001-2018	1, 3
Number of trimmings	Numerical	integer	1995-2018	1, 3, 4, 5
Fertilization				
Input against chlorosis	Categorical	4 levels: no input, treatment onto soil, treatment onto leaves, both	1988-2018	1, 3
Liming	Numerical	integer: number of applications per year	1988-2018	1, 3
Organic matter supplementation	Categorical	4 levels: none, organic fertilizer, organic enrichment, manure	1988-2018	1, 3
Foliar applications	Binomial	yes, no	1990-2018	1, 3
Mineral nitrogen fertilization	Numerical	N units per ha	1988-2018	1, 3

SUPPLEMENTARY DATA

Merot, A., Thiollet-Scholius, M., Sladeczek, M., Hossard, L., & Smits, N. (2025). Long term analysis of the link between practices and vineyard decline in relation to abiotic factors. *OENO One*, 59(1).

<https://doi.org/10.20870/oeno-one.2025.59.1.8285>



Organic nitrogen fertilization	Numerical	N units per ha	1988-2018	1, 3
Mineral phosphate fertilizer	Numerical	P ₂ O ₅ units per ha	1988-2018	1, 3
Organic phosphate fertilizer	Numerical	P ₂ O ₅ units per ha	1988-2018	1, 3
Mineral potassium fertilizer	Numerical	K ₂ O units per ha	1988-2018	1, 3, 4, 5
Organic potassium fertilizer	Numerical	K ₂ O units per ha	1988-2018	1, 3
Mineral magnesium fertilizer	Numerical	MgO units per ha	1988-2018	1, 3, 4
Organic magnesium fertilizer		Numerical (MgO units per ha)	1988-2018	1, 3
Location of mineral fertilizer inputs	Categorical	Categorical 3 levels (100% area, alternate row, localised)	1992-2018	1, 3
Pests and diseases control				
Total number of treatments during the growing season	Numerical	Numerical, integer per year	1991-2018	1, 3, 4, 5
Number of row faces treated in full vegetation	Categorical	Categorical, 2 levels (all row faces, every other one)	1995-2018	1, 3
Number of treatments with sodium arsenite	Numerical	Numerical, integer per year	1993-2018	1, 3, 4, 5
Number of insecticide or acaricide treatments	Numerical	Numerical, integer per year	1991-2014	1, 3
Number of DMI fungicide treatments	Numerical	Numerical, integer per year	1991-2014	1, 3
Number of treatments against downy mildew	Numerical	Numerical, integer per year	1991-2014	1, 3, 4, 5
Number of treatments against powdery mildew	Numerical	Numerical, integer per year	1991-2014	1, 3, 4, 5
Number of treatments against Botrytis	Numerical	Numerical, integer per year	1991-2014	1, 3
Total amount of pesticides sprayed on vegetation	Numerical	Numerical, volume per hectare	1993-2018	1, 3, 4, 5
Number of sulfur dusting	Numerical	Numerical, integer per year quantitative	1991-2014	1, 3
Treatment product recovery panels use	Ordinal	3 levels: no, only for winter treatment, at least for one treatment during growing season	1993-2018	1, 3
Type of sprayer used on vegetation	Categorical	3 levels: aeroconvection sprayer, pneumatic sprayer, sprayer cannons	1993-2018	1, 3

SUPPLEMENTARY DATA

Merot, A., Thiollot-Scholtus, M., Sladeczek, M., Hossard, L., & Smits, N. (2025). Long term analysis of the link between practices and vineyard decline in relation to abiotic factors. *OENO One*, 59(1).
<https://doi.org/10.20870/oeno-one.2025.59.1.8285>



Table S3. Variables characterizing productivity and mortality. These variables were used to characterize the yield and vine mortality in the plots. The annual yield (grey boxes) was not used itself, but was used to calculate the two other yield variables. All variables in this table are numerical.

Variable ID	Measured variable	Variable unit	Measurement period	Dynamic/static
Mortality				
new_dead	Number of newly dead vines in the plot among the 20 monitored vines, measured each year	Dead vines per year. Integer between 0 and 20	1995-2018	Dynamic
av_new_dead	Mean number of new death among the 20 monitored vines of the plot, over the observation period	Dead vines per year. [0; 20]	calculated	Fixed value
new-dead-slope	Slope of the regression of new_dead over the observation period	Dead vines per year. [-20; 20]	calculated	Fixed value
Yield				
annual_yield	Annual yield claimed by grower	hl.ha ⁻¹	1991-2018	Dynamic
yield_slope	Slope of the regression of annual_yield over the observation period	hl.ha ⁻¹ per year	calculated	Fixed value
av_yield_ratio	Ratio between annual_yield and the regional reference yield, averaged over the observation period	No unit	calculated	Fixed value