MAIZE CLIMATIC SCENARIOS

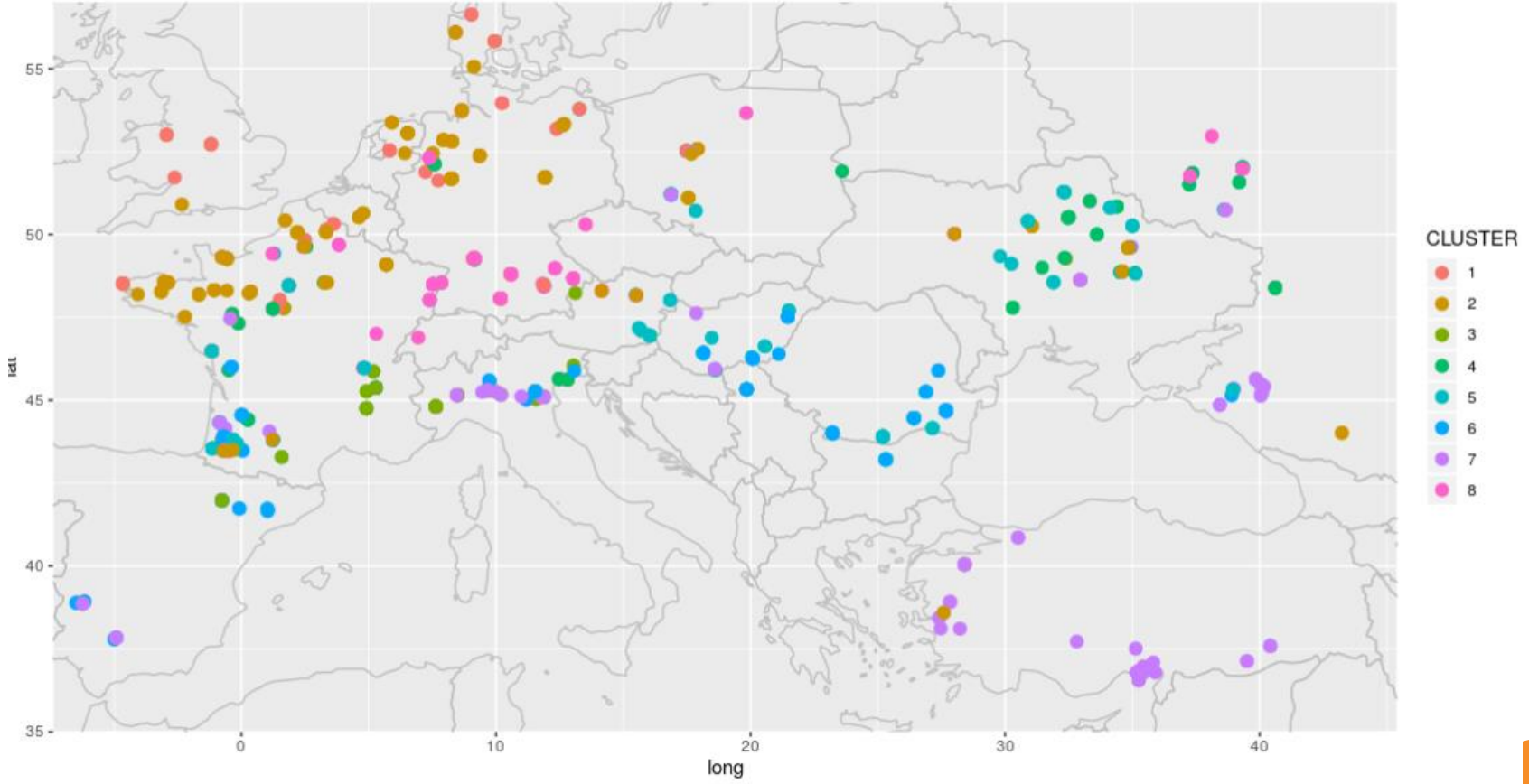
Description of the 8 climatic scenarios
on 987 R&D precocity*location
couples from 2016 to 2019.

masseeds
UNITED TO GROW

Mean of the 18 agro-climatic indicators describing the climatic scenarios

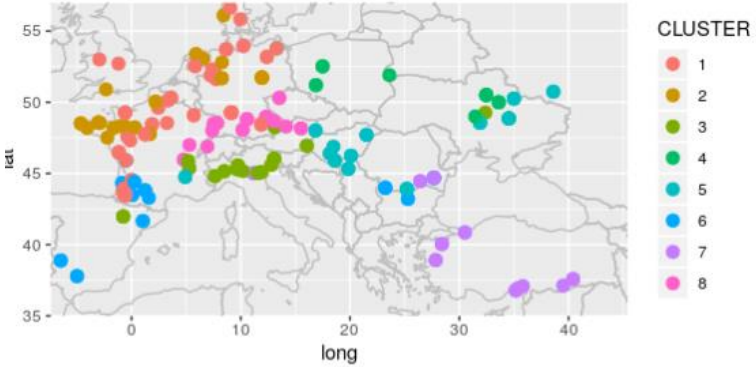
		Cold Stress (number of days with T min < 10°C)				WATER (sum of precipitations + irrigation in mm)					HYDRIC STRESS (intensity of hydric stress)		HEAT (number of days with Tmax > 34°C)	MEAN LIGHT RADIATION		Daylight duration	Accumulation of Solar Radiation		
Cluster		Flo initiation	Pre-Flowering	Flowering	Filling	Emergence	Growth	Flo initiation	Flowering	Filling	Pre-Flowering	Flowering	Filling	Growth	Flo initiation	Flowering	Pre-Flowering	Flowering	Filling
1	Mar. Cold Humid	2,1	1,9	2,0	6,5	22,5	124,4	49,3	61,0	77,7	0,0	0,1	1,4	17,2	18,5	13,1	394,0	346,7	501,1
2	Mar. Cold Dry	2,2	2,8	1,1	5,0	20,0	102,6	20,2	27,0	49,0	0,4	0,9	0,9	19,0	21,7	13,4	409,2	340,7	499,0
3	Med. Temp Humid	0,7	0,9	0,4	5,4	22,9	206,8	185,5	127,5	273,0	0,0	0,0	3,6	21,5	25,4	13,6	382,6	354,6	808,6
4	Temp Hot	1,0	0,9	0,3	5,5	18,9	87,6	47,9	51,6	85,5	0,0	0,0	1,4	20,9	23,0	13,6	343,2	313,5	677,2
5	Temp Mild	0,8	0,9	0,8	4,0	29,2	97,5	52,4	73,0	96,2	0,0	0,2	2,1	21,3	24,0	13,7	393,1	370,9	781,0
6	Med. Hot Humid	0,7	0,2	0,1	1,0	21,5	178,0	82,3	63,4	125,5	0,0	0,1	9,5	19,7	24,3	13,4	374,9	361,5	811,7
7	Med Hot Dry	0,5	0,3	0,1	2,3	18,1	78,8	32,0	25,5	55,9	0,6	0,9	9,8	22,2	25,1	13,5	381,2	359,0	789,0
8	Cont. Cold	2,2	6,2	3,3	9,2	34,6	139,7	62,2	53,9	73,3	0,0	0,3	1,0	19,7	23,5	13,5	432,3	371,0	626,1

Clustering pluriannual

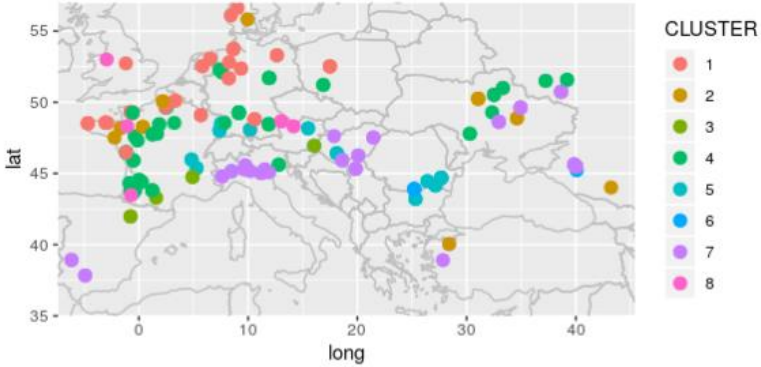


Clustering by year

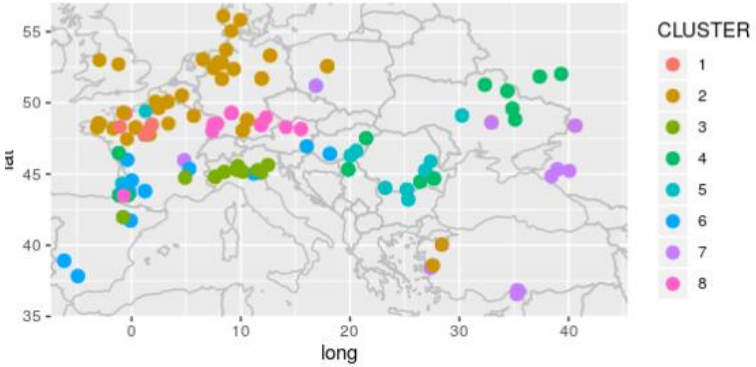
2016



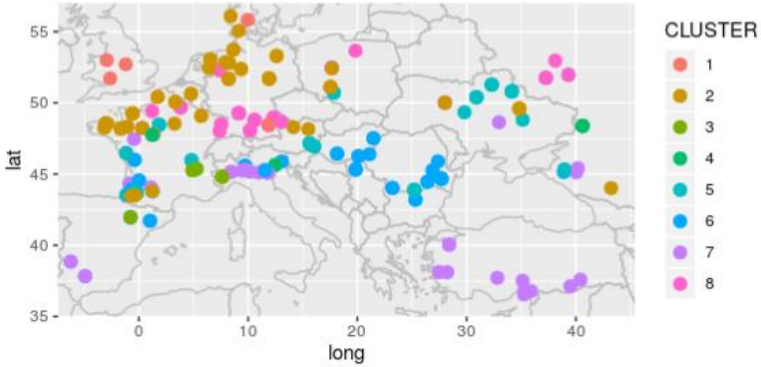
2017



2018

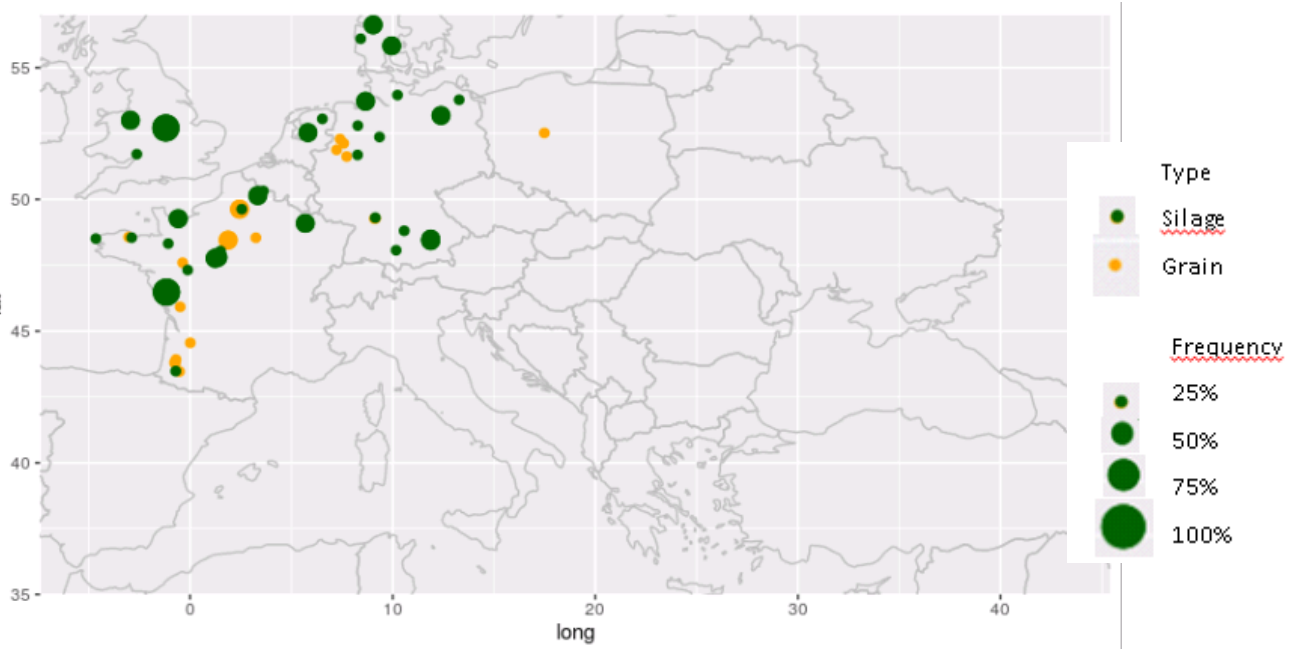


2019



Cluster 1 : Maritime Cold Humid

	Cold Stress (number of days with T min < 10°C)				WATER (sum of precipitations + irrigation in mm)					HYDRIC STRESS (intensity of hydric stress)		HEAT (Tmax > 34°C)	MEAN LIGHT RADIATION		Daylight duration	Accumulation of Solar Radiation		
Cluster	Flo initiation	Pre-Flowering	Flowering	Filling	Emergence	Growth	Flo initiation	Flowering	Filling	Pre-Flowering	Flowering	Filling	Growth	Flo initiation	Flowering	Pre-Flowering	Flowering	Filling
1	2,1	1,9	2,0	6,5	22,5	124,4	49,3	61,0	77,7	0,0	0,1	1,4	17,2	18,5	13,1	394,0	346,7	501,1

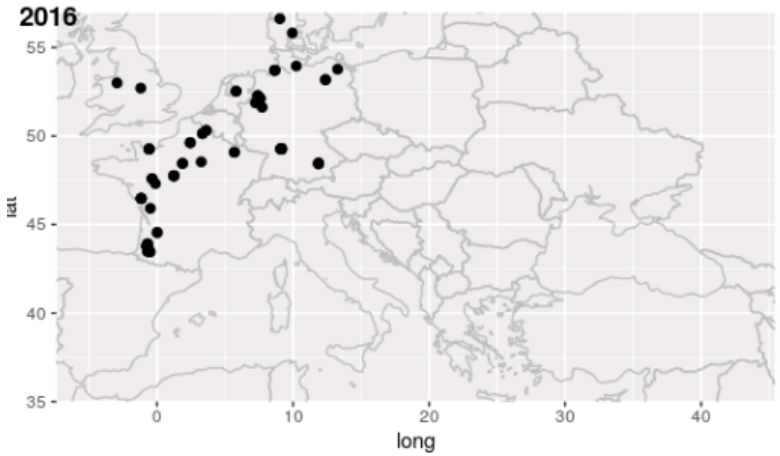


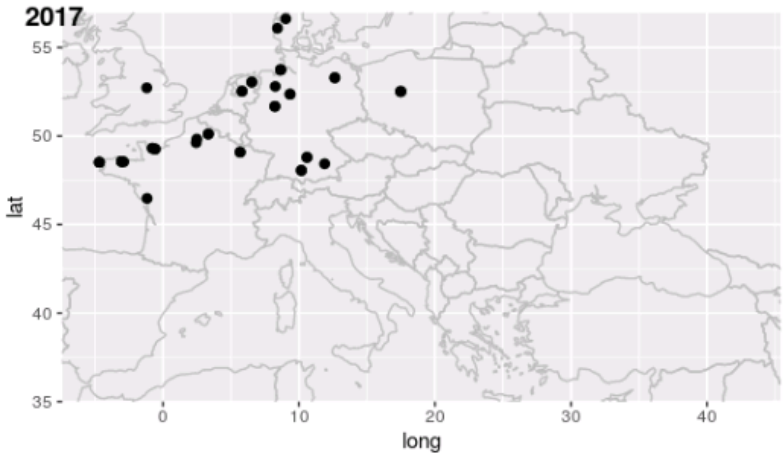
- **Very low solar radiation** at vegetative stages and grain filling stage.
- **Short day length at flowering** (late flowering)
- **Cold stress**
- Average precipitation
- Very low drought stress

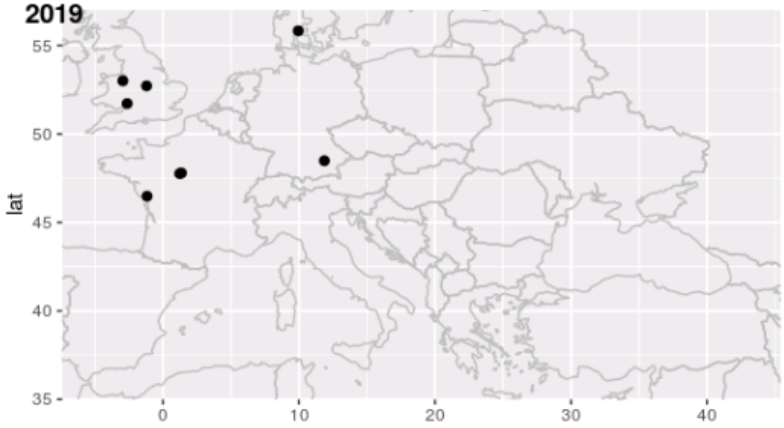
Pluriannual Cluster 1

Typical north – west europe, with rain (england, brittany...)

FCN silage UKF

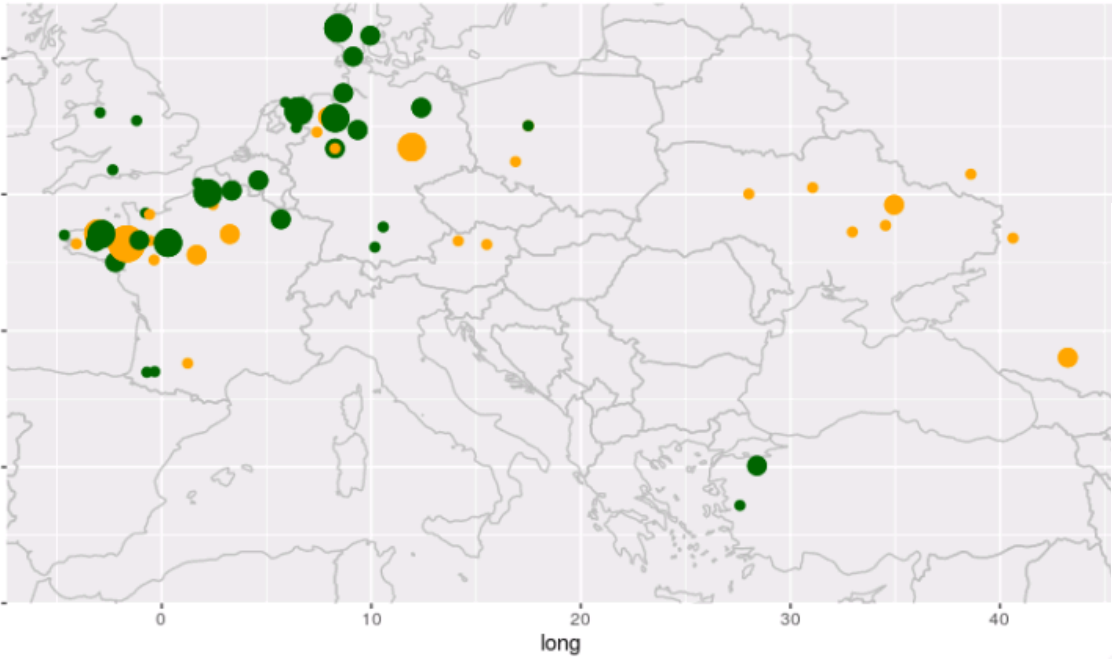






Cluster 2 : Maritime Cold Dry

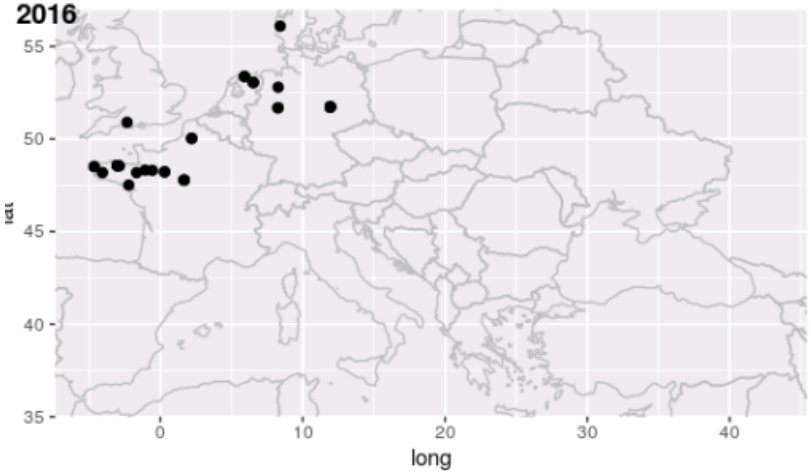
	Cold Stress (number of days with T min < 10°C)				WATER (sum of precipitations + irrigation in mm)					HYDRIC STRESS (intensity of hydric stress)		HEAT (Tmax > 34°C)	MEAN LIGHT RADIATION		Daylight duration	Accumulation of Solar Radiation		
Cluster	Flo initiation	Pre-Flowering	Flowering	Filling	Emergence	Growth	Flo initiation	Flowering	Filling	Pre-Flowering	Flowering	Filling	Growth	Flo initiation	Flowering	Pre-Flowering	Flowering	Filling
2	2,2	2,8	1,1	5,0	20,0	102,6	20,2	27,0	49,0	0,4	0,9	0,9	19,0	21,7	13,4	409,2	340,7	499,0

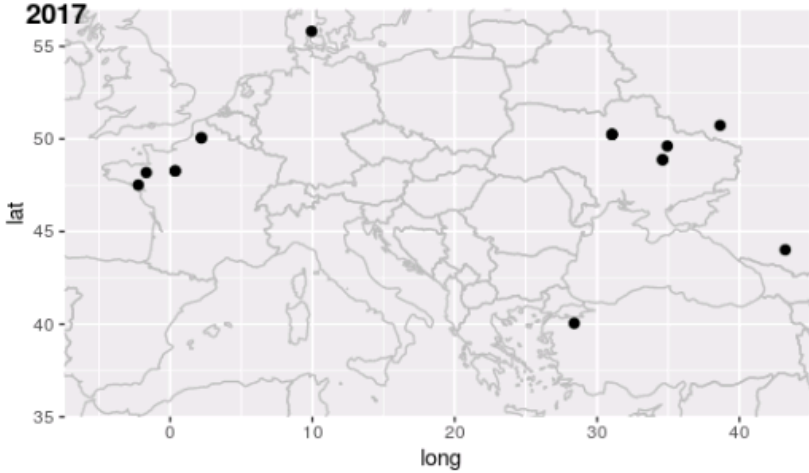


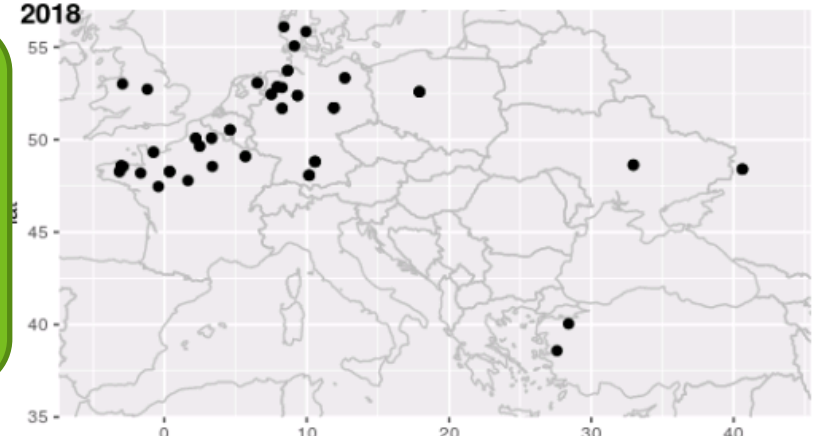
- **Low solar radiation** at vegetative stages and grain filling stage.
- **Cold stress**
- Very low precipitation
- **High flowering drought stress and grain fill stress** due to extremely low precipitation

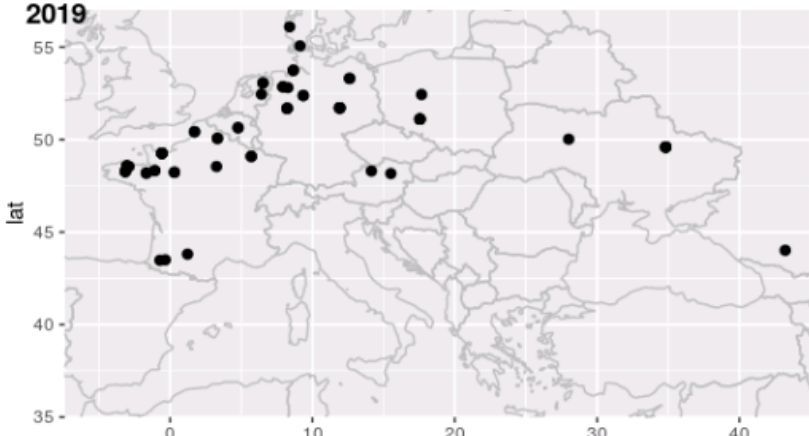
Cluster 2 pluriannual

Typical north – west europe, no irrigation or no rain





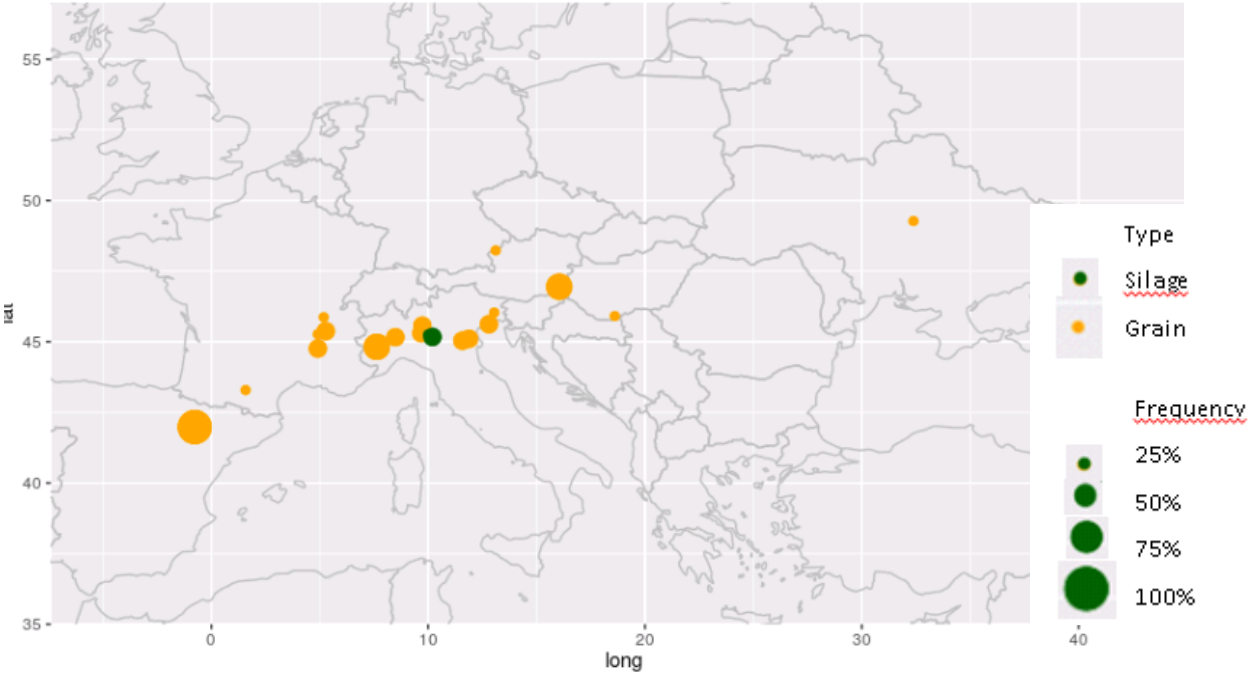




FBE
FSB
FDB
GAJ

Cluster 3 : Mediterranean Temperate Humid

	Cold Stress (number of days with T min < 10°C)				WATER (sum of precipitations + irrigation in mm)					HYDRIC STRESS (intensity of hydric stress)		HEAT (Tmax > 34°C)	MEAN LIGHT RADIATION		Daylight duration	Accumulation of Solar Radiation		
Cluster	Flo initiation	Pre-Flowering	Flowering	Filling	Emergence	Growth	Flo initiation	Flowering	Filling	Pre-Flowering	Flowering	Filling	Growth	Flo initiation	Flowering	Pre-Flowering	Flowering	Filling
3	0,7	0,9	0,4	5,4	22,9	206,8	185,5	127,5	273,0	0,0	0,0	3,6	21,5	25,4	13,6	382,6	354,6	808,6

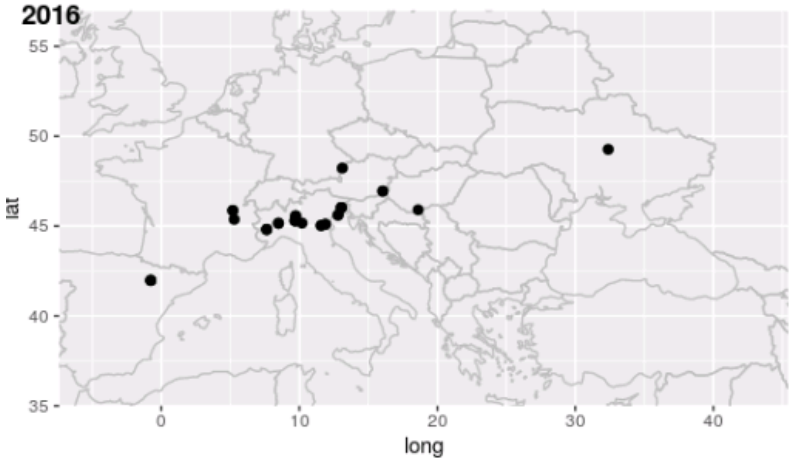


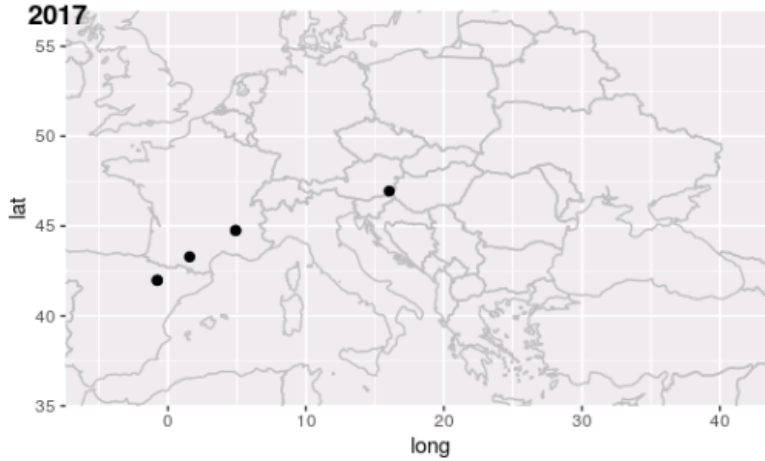
- **High solar radiation** at vegetative stages and high accumulation of solar radiation at grain filling stage.
- **Very high precipitation** during all the cycle
- **No drought stress (irrigated)**

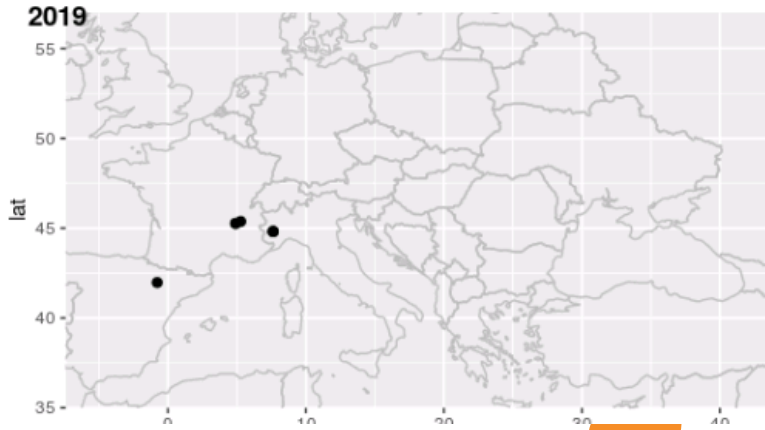
Cluster 3 pluriannual

Typical Italy, north of Spain, Rhone Valley

ICN
EZA

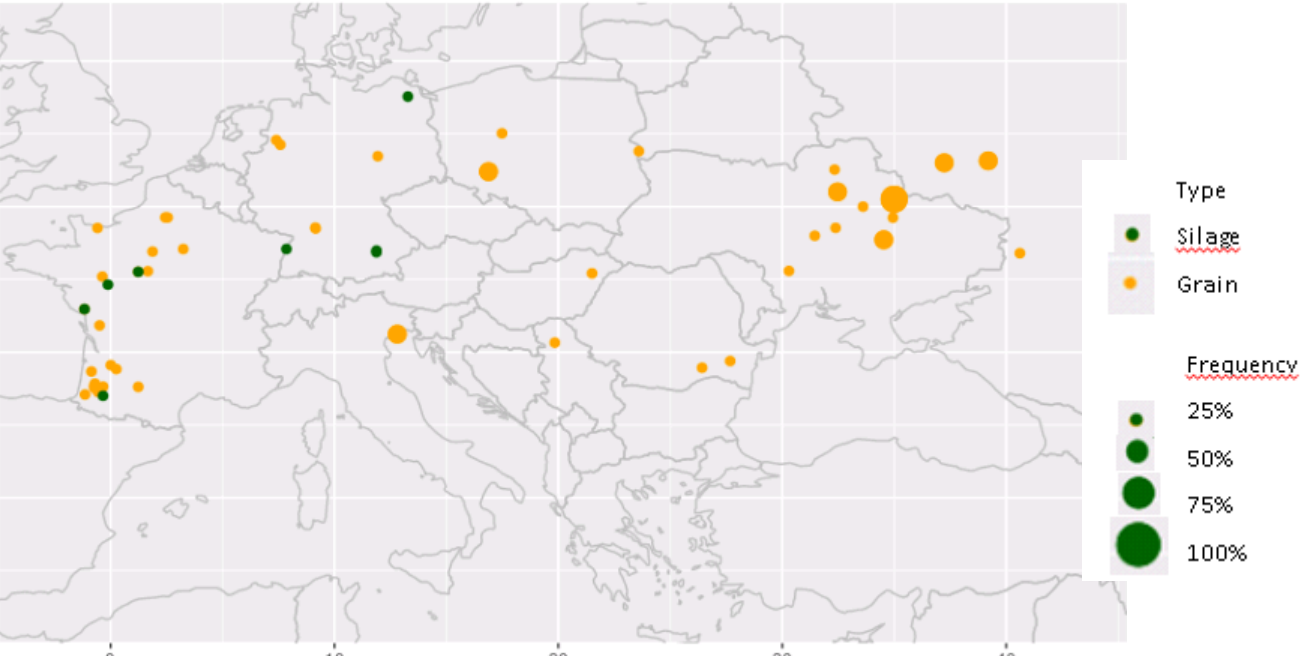






Cluster 4 : Temperate Hot

	Cold Stress (number of days with T min < 10°C)				WATER (sum of precipitations + irrigation in mm)					HYDRIC STRESS (intensity of hydric stress)			MEAN LIGHT RADIATION		Daylight duration	Accumulation of Solar Radiation		
Cluster	Flo initiation	Pre-Flowering	Flowering	Filling	Emergence	Growth	Flo initiation	Flowering	Filling	Pre-Flowering	Flowering	Filling	Growth	Flo initiation	Flowering	Pre-Flowering	Flowering	Filling
4	1,0	0,9	0,3	5,5	18,9	87,6	47,9	51,6	85,5	0,0	0,0	1,4	20,9	23,0	13,6	343,2	313,5	677,2

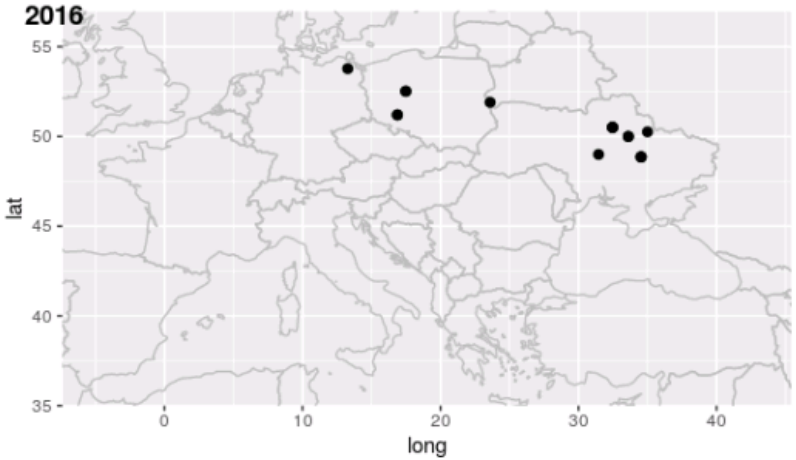


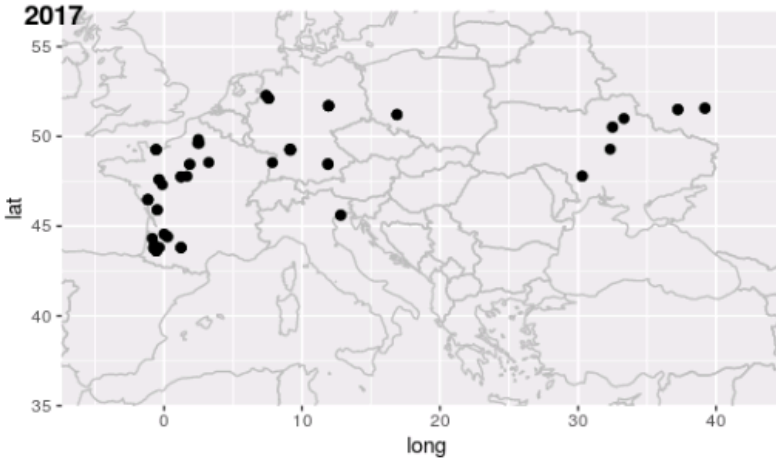
- **Average solar radiation** at vegetative stages and **low accumulation of solar radiation** at flowering stages
- No cold stress
- Below average precipitation
- No drought stress

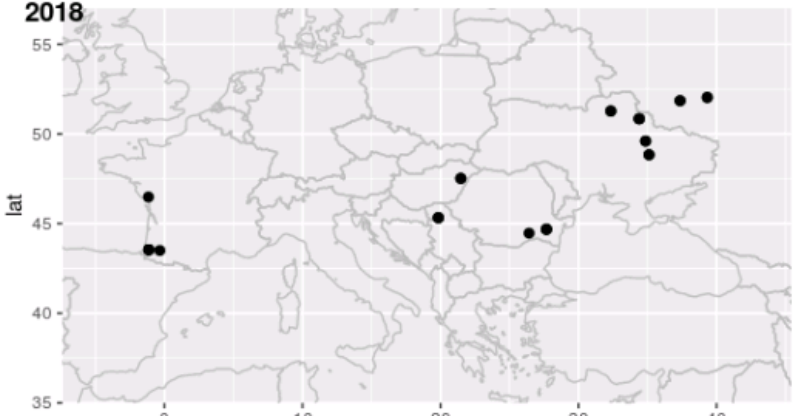
Cluster 4 pluriannual

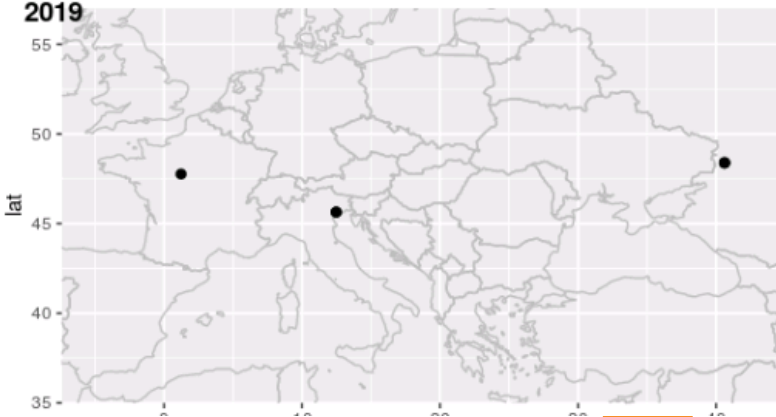
Frequently found in Ukraine

KMO



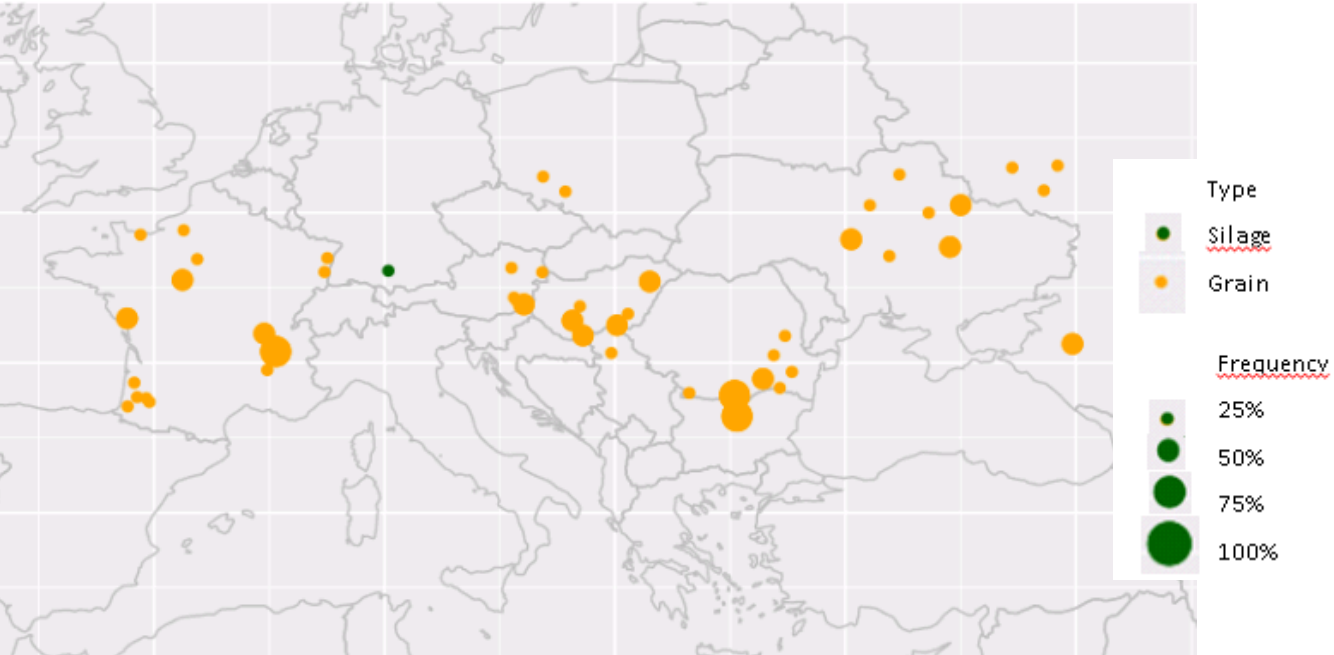






Cluster 5 : Temperate Mild

	Cold Stress (number of days with T min < 10°C)				WATER (sum of precipitations + irrigation in mm)					HYDRIC STRESS (intensity of hydric stress)		HEAT (Tmax > 34°C)	MEAN LIGHT RADIATION		Daylight duration	Accumulation of Solar Radiation		
Cluster	Flo initiation	Pre-Flowering	Flowering	Filling	Emergence	Growth	Flo initiation	Flowering	Filling	Pre-Flowering	Flowering	Filling	Growth	Flo initiation	Flowering	Pre-Flowering	Flowering	Filling
5	0,8	0,9	0,8	4,0	29,2	97,5	52,4	73,0	96,2	0,0	0,2	2,1	21,3	24,0	13,7	393,1	370,9	781,0

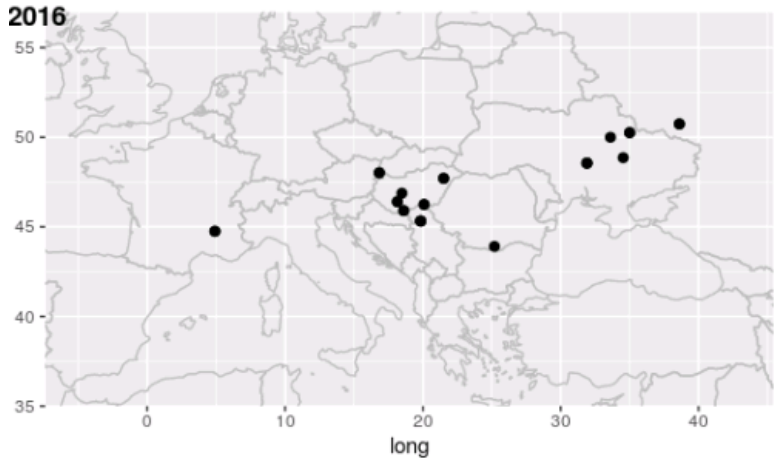


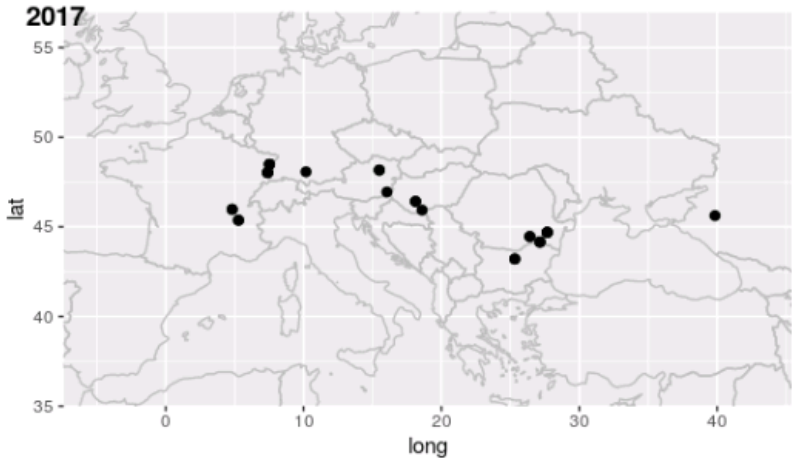
- **High accumulation of solar radiation**
- **Long day length** at flowering
- No cold stress
- High **precipitation at emergence**
- Very low drought stress at flowering

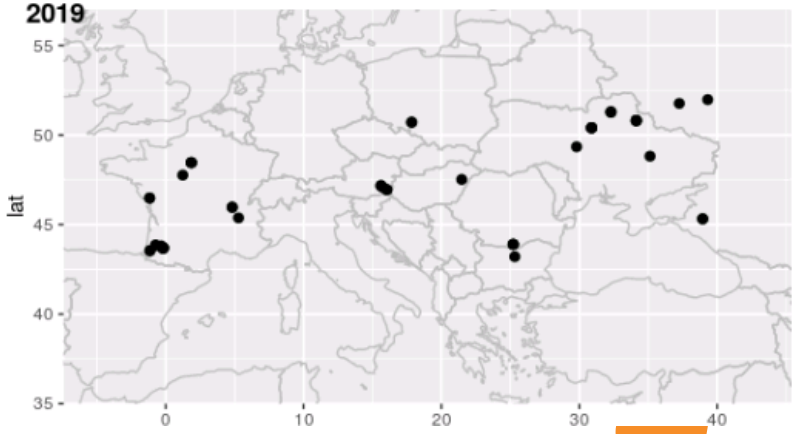
Cluster 5 Pluriannual

Frequently found in Hungary, Romania

BPL

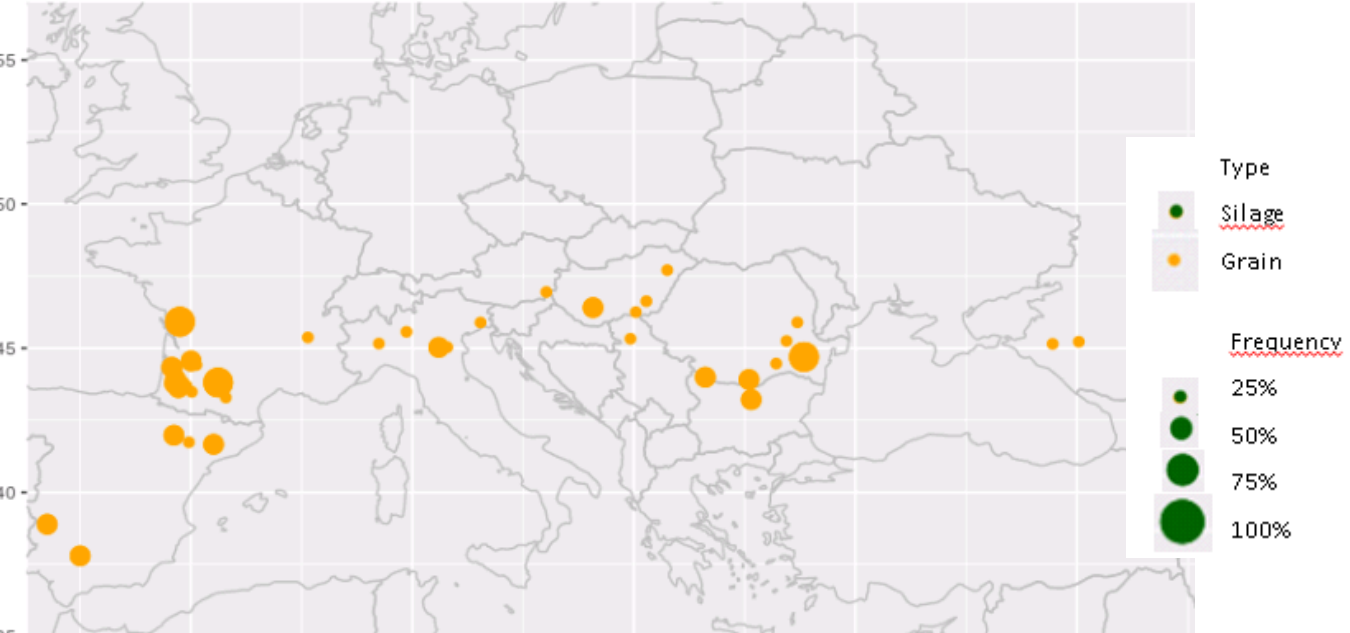






Cluster 6 : Mediterranean Hot Humid

	Cold Stress (number of days with T min < 10°C)				WATER (sum of precipitations + irrigation in mm)					HYDRIC STRESS (intensity of hydric stress)		HEAT (Tmax > 34°C)	MEAN LIGHT RADIATION		Daylight duration	Accumulation of Solar Radiation		
Cluster	Flo initiation	Pre-Flowering	Flowering	Filling	Emergence	Growth	Flo initiation	Flowering	Filling	Pre-Flowering	Flowering	Filling	Growth	Flo initiation	Flowering	Pre-Flowering	Flowering	Filling
6	0,7	0,2	0,1	1,0	21,5	178,0	82,3	63,4	125,5	0,0	0,1	9,5	19,7	24,3	13,4	374,9	361,5	811,7

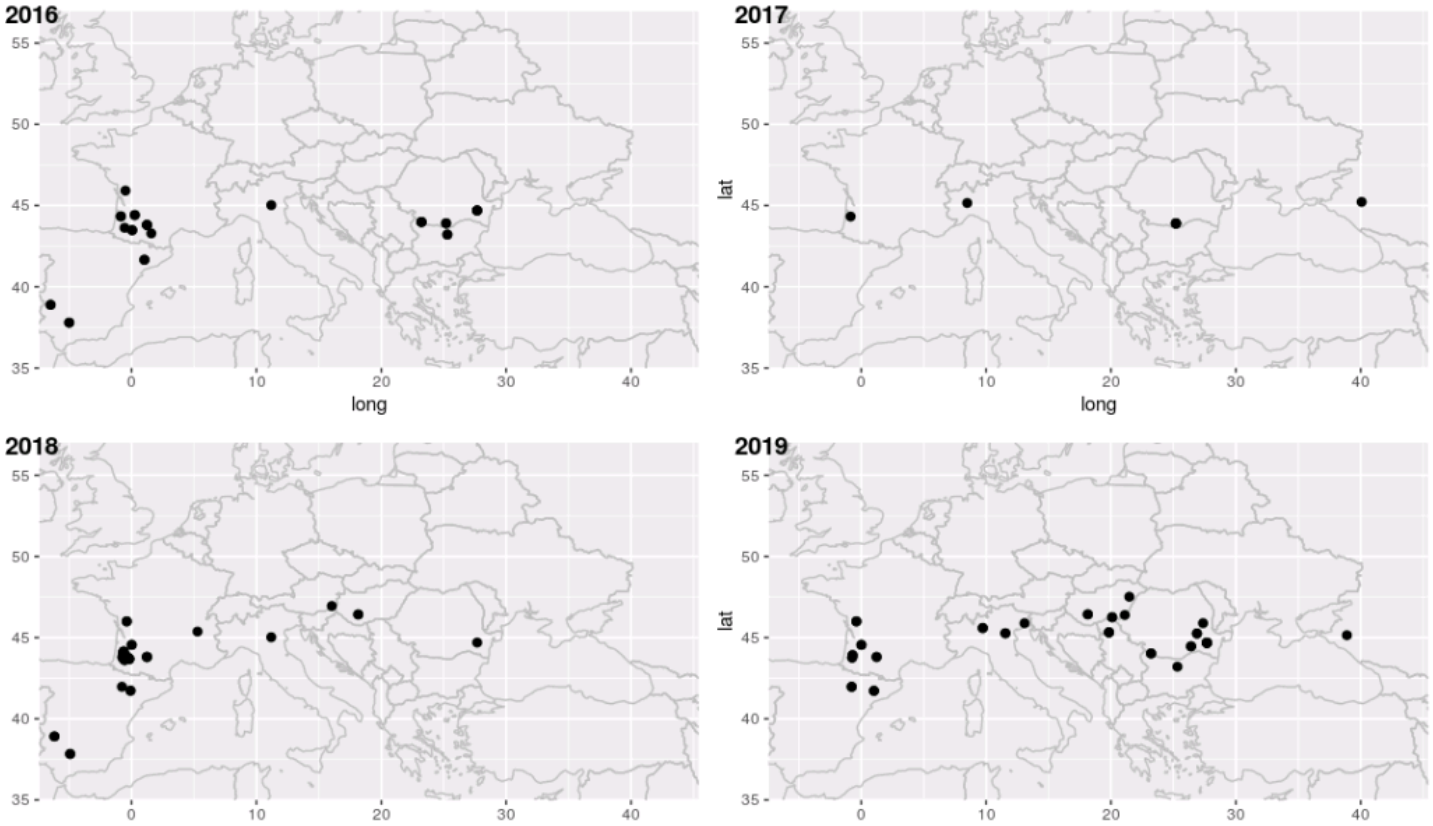


- **High solar radiation** accumulation at grain filling.
- **Heat stress at grain fill**
- No cold stress
- Good precipitation during the cycle
- Almost **no drought stress**

Cluster 6 pluriannual

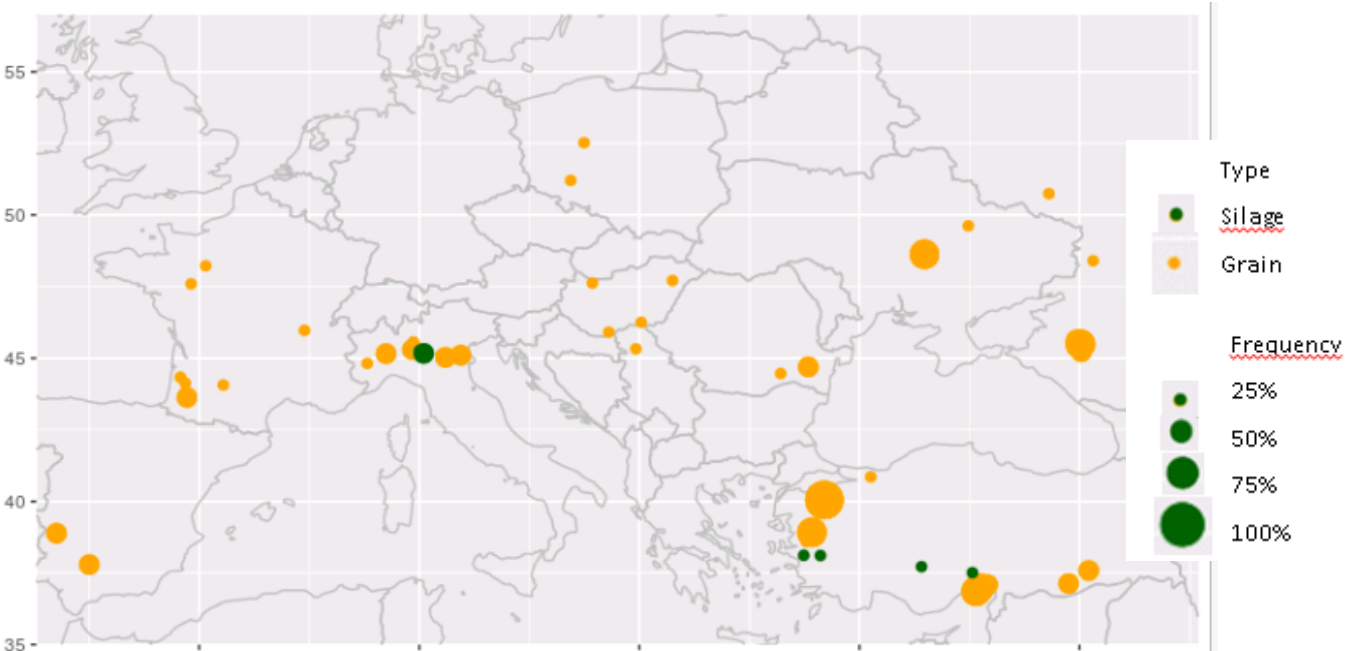
Typical South-west of France

ELR
FMC
FSJ
RCR



Cluster 7 : Mediterranean Hot Dry

	Cold Stress (number of days with T min < 10°C)				WATER (sum of precipitations + irrigation in mm)					HYDRIC STRESS (intensity of hydric stress)		HEAT (Tmax > 34°C)	MEAN LIGHT RADIATION		Daylight duration	Accumulation of Solar Radiation		
Cluster	Flo initiation	Pre-Flowering	Flowering	Filling	Emergence	Growth	Flo initiation	Flowering	Filling	Pre-Flowering	Flowering	Filling	Growth	Flo initiation	Flowering	Pre-Flowering	Flowering	Filling
7	0,5	0,3	0,1	2,3	18,1	78,8	32,0	25,5	55,9	0,6	0,9	9,8	22,2	25,1	13,5	381,2	359,0	789,0

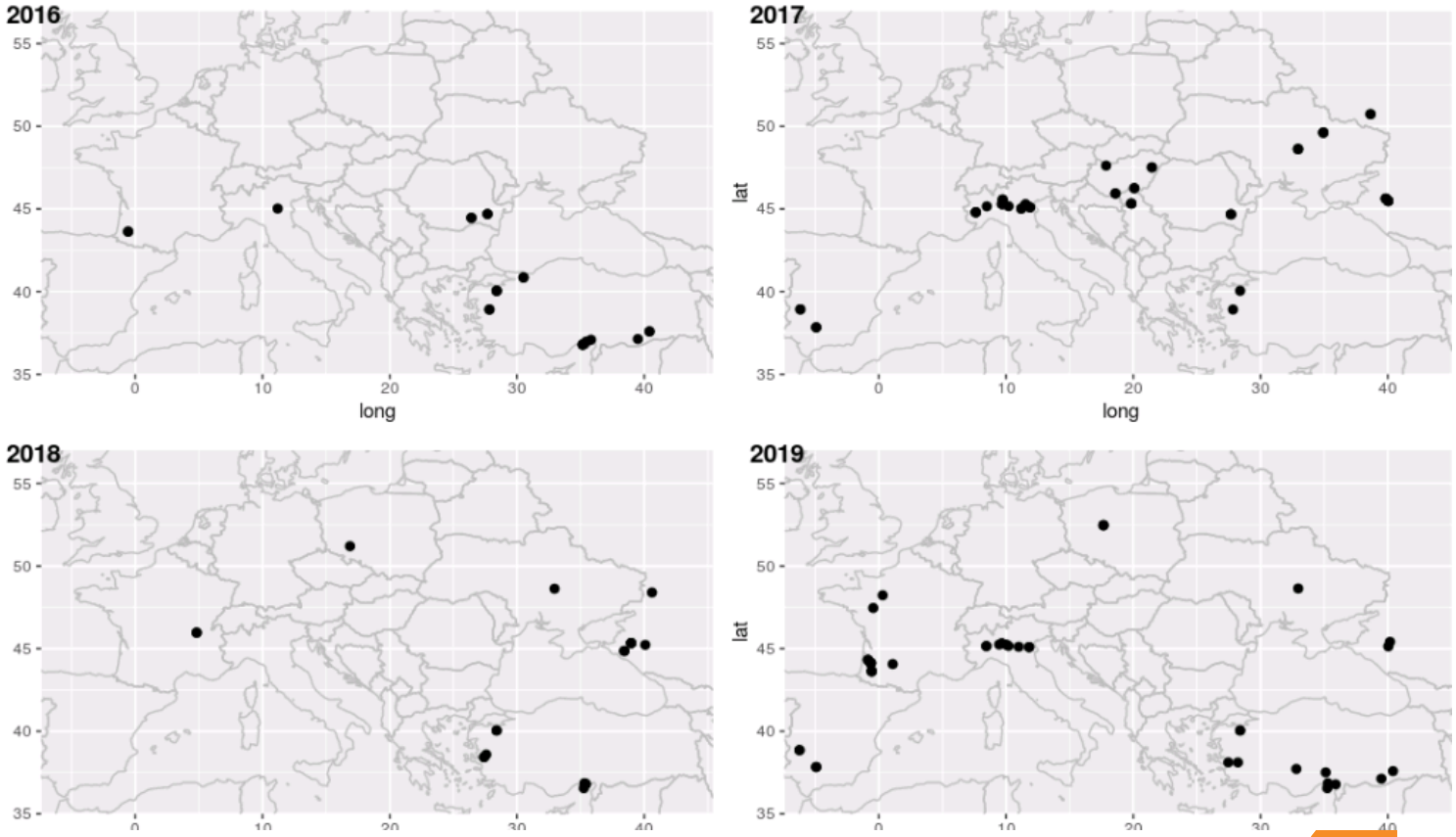


- High solar radiation at vegetative stages and High solar radiation accumulation at grain filling
- **Heat stress at grain filling**
- No cold stress
- **Very low precipitation** during all the cycle
- **Very high drought stress**

Cluster 7 pluriannual

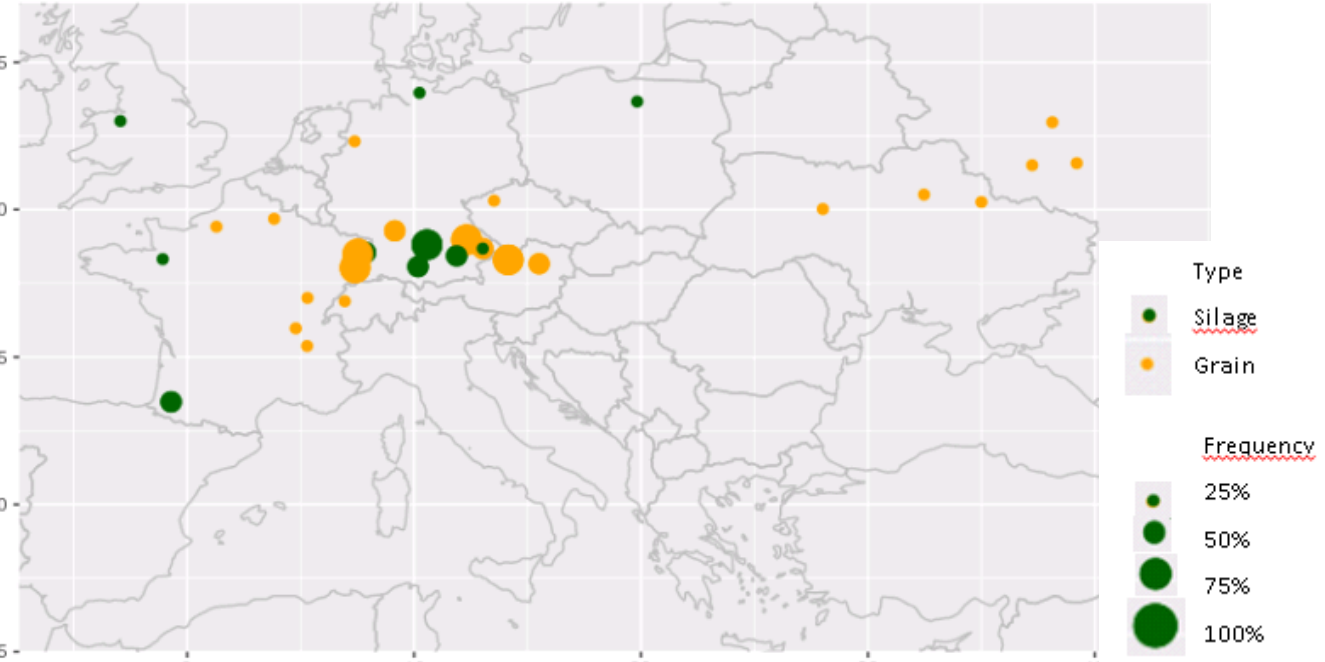
Typical Russia, South of Spain, Turkey with no irrigation

KOL
SLA
SNO
STE



Cluster 8 : Continental Cold

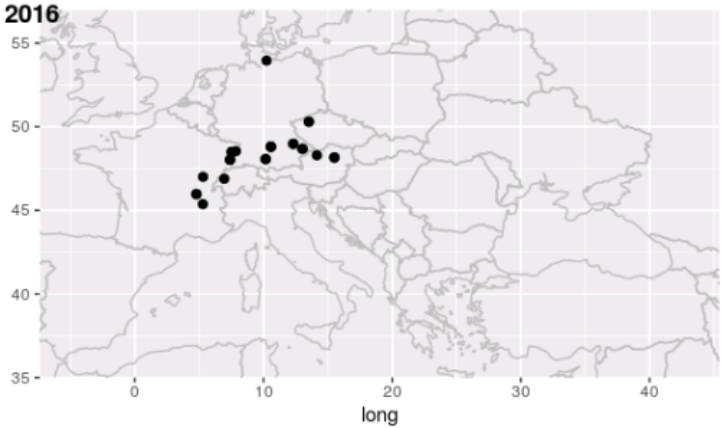
	Cold Stress (number of days with T min < 10°C)				WATER (sum of precipitations + irrigation in mm)					HYDRIC STRESS (intensity of hydric stress)		HEAT (Tmax > 34°C)	MEAN LIGHT RADIATION		Daylight duration	Accumulation of Solar Radiation		
Cluster	Flo initiation	Pre-Flowering	Flowering	Filling	Emergence	Growth	Flo initiation	Flowering	Filling	Pre-Flowering	Flowering	Filling	Growth	Flo initiation	Flowering	Pre-Flowering	Flowering	Filling
8	2,2	6,2	3,3	9,2	34,6	139,7	62,2	53,9	73,3	0,0	0,3	1,0	19,7	23,5	13,5	432,3	371,0	626,1

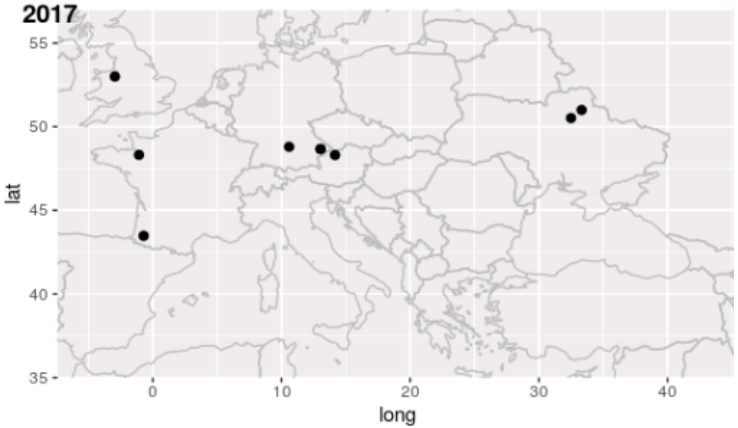


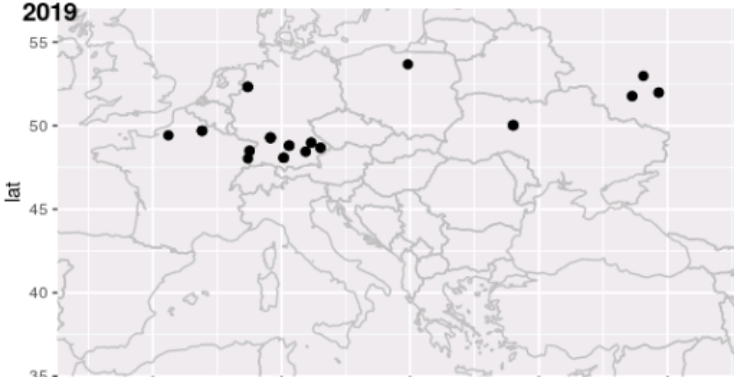
- High solar radiation accumulation at flowering stages
- **Very high cold stress** during all the cycle
- **Very high precipitation at emergence**
- Some drought stress at flowering

Cluster 8 pluriannual

Typical South of Germany, East of France (Alsace), Austria







ASH
GAI
GRE
FAP
FOB