The Sauternes appellation

Foreword

What follows is based on the work of Jean Paul Party of Sol-Conseil, which in 2012 and 2013, with colleagues Quentin Vauthier and Nicolas Muller, mapped the soils of Sauternes. Many thanks for their permission to share this work.

Overview

The Sauternes and Barsac vineyards are located about 50 km south-east of Bordeaux on the left bank of the Garonne just after a bend in its course towards the north (Figure 1). This privileged location provides the climate conditions necessary for the *botrytization* of Sauternes grapes by noble rot. Although the associated effects are not well studied, the climatic conditions according to data from Météo-France (Bordeaux-Mérignac station) correspond to the typical Aquitaine oceanic climate, which is rather favorable to fungal pressure:

- Average annual rainfall between 800 and 900 mm:
  - minimum at the end of winter in March (50 to 60 mm)
  - maximum at the end of spring in June (70 to 80 mm)
  - end of autumn in November (80 to 100 mm)
- Average annual temperature close to 10°C:
  - maximum in July-August (around 20°C)
  - minimum in January (around 3°C).

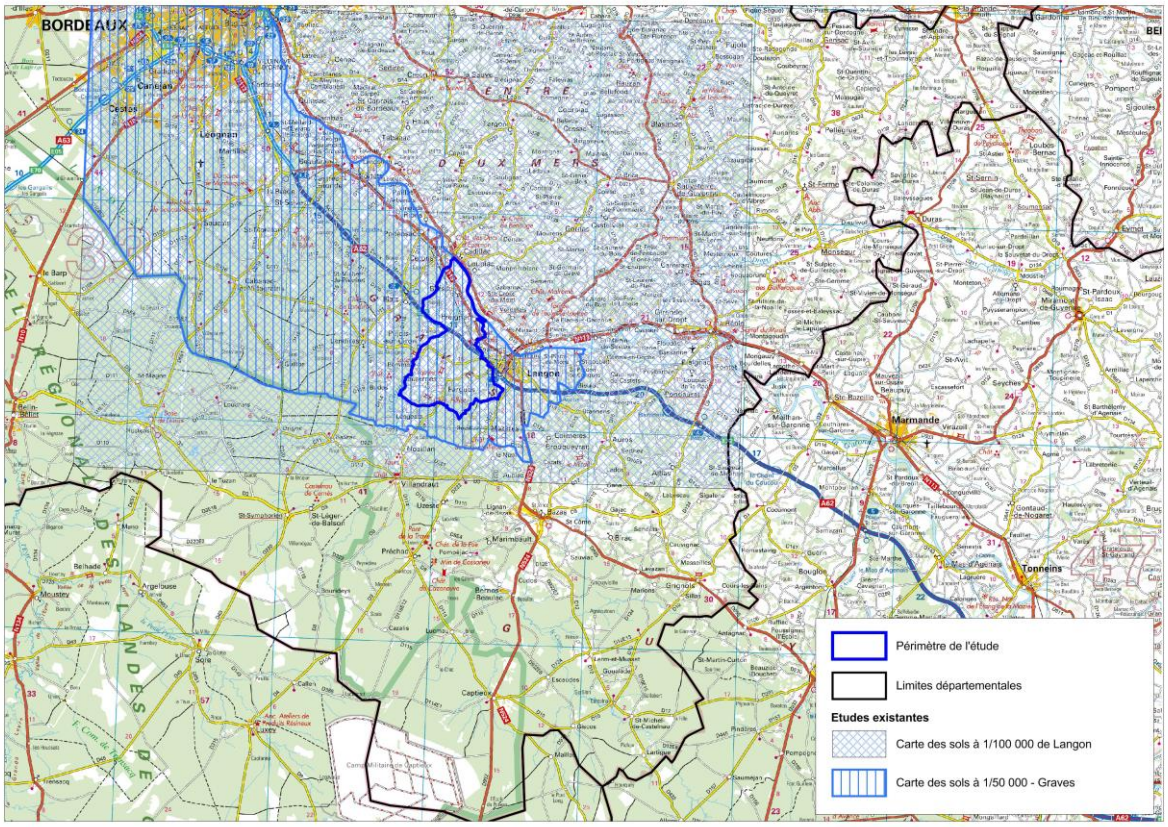

Figure 1: Location of Sauternes and Barsac vineyards (Party *et al*., 2013)

The Sauternes and Barsac appellations encompass the communes of Sauternes, Barsac, Preignac, Fargues and Bommes, covering a total area of around 6,000 ha. Of these, just under 2,900 ha are designated A.O.P. “Sauternes and Barsac”. The rest of the classified surfaces as A.O.P. (approx. 300 ha), produce dry whites in particular (AOP Graves or Bordeaux). Of all the 6,000 ha in total, only 2,400 ha are planted in vines (Table 1).

N°INSEE	COMMUNES	Aire totale (ha)	Aire en AOC (ha)	Aire en AOC Sauternes	Surface en vignes (2008)
33030	BARSAC	1346	989	796	751
33060	BOMMES	580	463	453	375
33164	FARGUES	1541	423	413	308
33337	PREIGNAC	1400	764	725	574
33504	SAUTERNES	1132	556	491	424
-	Total	**5999**	**3195**	**2878**	**2432**

Table 1: Breakdown of appellation and planted areas by municipality

Geological and hydrological context

Within the Sauternes and Barsac appellations, we can distinguish three geomorphological units taken from the geological map (Figure 3), namely:

- Valley of the river Garonne made up mainly of recent Holocene alluvium (Fyb) with silty and sandy loam, mainly a place of field crops, along with its tributaries (mainly in the Ciron valley) of recent alluvium (Fz) sandy to sandy moist clays,
- Hilly terraces with notches and multiple exposures oriented to the North-East, made up of four levels of very gradual succession: low terrace (Fxc), medium terraces (Fxb1 and Fxb2), high terraces (Fxb) and very high terraces (p- Fu) covered with silty or most often sandy colluvium (CF or NF)
- Tertiary limestone formations outcropping mainly on steep slopes (Miocene limestone and marl, m1a and m1c) and along the Ciron (Asteria limestone from the Oligocene, g2).

These units are located at altitudes from 8 m up to 85 m at the top of the terraces, with slopes that can be quite steep locally.

The vines in Sauternes benefit from the influence of two rivers, the Garonne and the Ciron. From a hydrological point of view, the Ciron drains most of the groundwater and runoff from the Sauternes. Moreover, given the almost permanent waterlogging, this river causes significant morning mists characteristic of Sauternes. This peculiarity favors the development of *Botrytis cinerea* bringing roasted aromas of honey and wax and causes over-ripening of the grapes in autumn (Figure 2).

Figure 2: Residual morning mists above the Ciron looking towards Bommes.

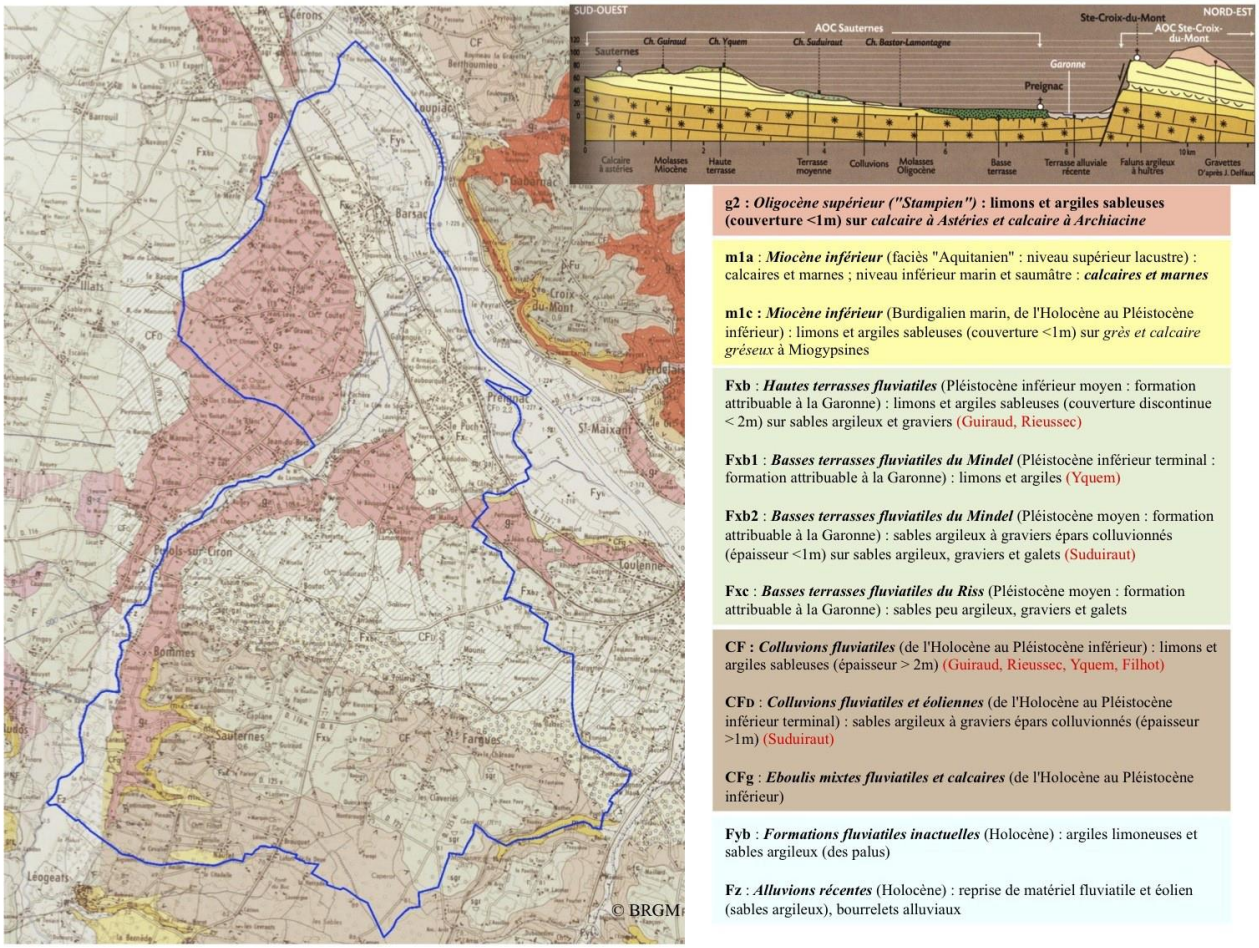

Figure 3: Geological map and section of Sauternes (Party et al., 2013)

Pedologic context

The soils identified on the 6,000 ha of Sauternes are based on a geomorphological division. This area covers the whole of Sauternes between the Garonne to the north and Landes to the south. The surfaces studied include soils mainly of alluvial and loamy and sandy colluvial origin, but also clay or clay-limestone.

A soil study in 2013 distinguished 35 different soil units in Sauternes and Barsac (Figure 5), which were grouped into eight major geomorphological groups as follows:

- rather silty decarbonated alluvial soils of the Garonne (Fyb, altitude < 10 m)
- rather acidic sandy-clayey alluvial soils of Ciron (Fz, altitude of 10 to 15 m)
- colluvial soils of the wet sandy and clayey valleys cutting into the hills (C, altitude 10 to 75 m)
- carbonated soils from outcrops of limestone materials (at Astéries, g2, altitude of 10 to 25 m), then marl-limestone and molasses of the hills (m1a-b, altitude of 25 to 60 m),
- soils of low sandy terraces with pebbles (Fxc, altitude of 10 to 15 m),
- soils of average sandy-clayey terraces with more or less colluvial pebbles (Fxb1-2 and CFD, altitude of 25 to 50 m),
- soils of high sandy-clayey terraces with more or less colluvial pebbles (Fxb and CF, altitude of 50 to more than 85 m).
- very acidic soils, located mainly on the summits, more or less podzolized, very deep (> 100 cm), essentially sandy (moorland sands) and hydromorphic, locally very organic, generally under forests but which can be planted in vines at its margins (Figure 4).

Figure 4: Oak forest and moorland give way to maritime pine forests.

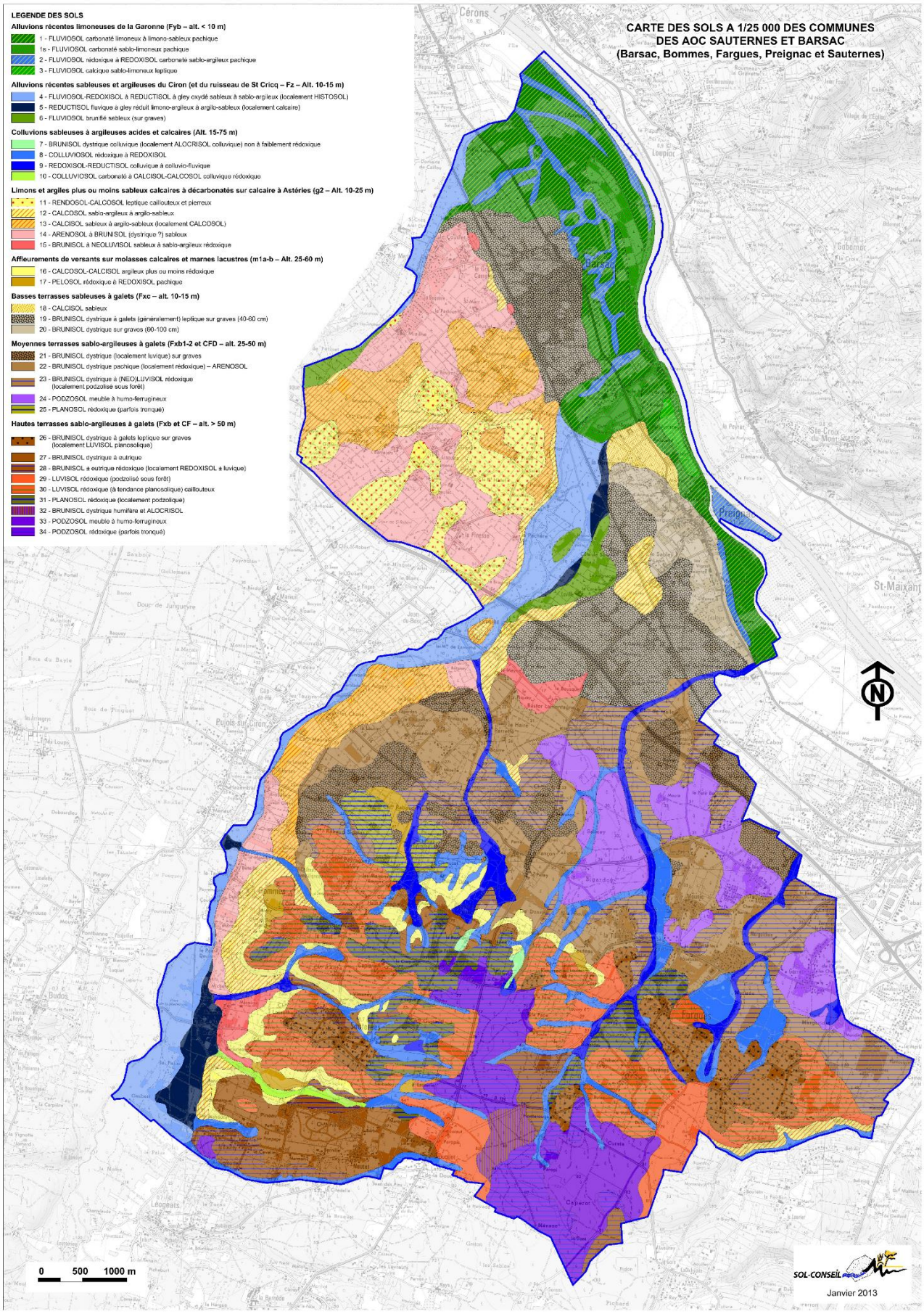

Figure 5: soil map of the Sauternes and Barsac appellations (Party et al., 2013)

Not surprisingly, in the long-standing wine-growing sector of Sauternes, we see a preponderance of brown and leached soils on gravel over about 45% of the surface area (2,726 ha). Nevertheless, due to the proximity of the Landes, the very acidic, podzolized forest soils (units 24 and 32 to 34) represent a fairly large 10% of the area (593 ha). Soils over limestone material are strongly represented, particularly around the Ciron valley and in the municipality of Barsac covering approximately 21% of the area (1,239 ha). Finally, the alluvial soils of the Garonne and Ciron, as well as the colluvial soils outside the wine-growing sector, together cover about 24% of the surface area (1,397 ha). The authors of the soil map also suggest that the high proportion of hydromorphic soils in the appellation favor the appearance of noble rot and the overconcentration of sugars in grape berries.

Profiles 1 and 2 dug in Barsac and Bommes are shown in Figure 6 and Profiles 3 and 4 dug in Fargues and Pregnac are shown in Figure 7 below.

Figure 6: Profile 1 – Gravelly soil on limestone (Barsac) / Profile 2 – Hydromorphic colluvial sandy soil (Bommes)

Figure 7: Profile 3 – Podzolized soil on old alluvial deposits (Fargues) and Profile 4 – Gravelly sandy soil (Preignac)

Grape varieties and cultural practices

The appellation decree specifies that four grape varieties can be used in Sauternes without any rule of proportion: Sémillon, Muscadelle, Sauvignon blanc, and Sauvignon gris. All these grape varieties are sensitive to noble rot, which is readily induced by the local climate (see above) and the often hydromorphic soils of the appellation.

- Sémillon is the main grape variety used for Sauternes. Sometimes with slightly low acidity, this variety makes up for it with ample structure, and a fat sweetness in the mouth. The skins of the berries are thick, so it lends itself well to botrytization.
- Muscadelle brings a touch of complexity to the blend. This variety is not widely cultivated, but with 5 to 10% maximum of the blend, it brings a very qualitative touch. Its susceptibility to disease during the growing season (grey rot, powdery mildew, berry worms), however, is a drawback and it is rarely planted.
- Sauvignon blanc has typical varietal aromas in dry wine: citrus fruits, blackcurrant buds or boxwood. When vinified sweet, it brings a touch of acidity to the blend, a guarantee of freshness and aromas.
- Sauvignon gris is the colorful version of Sauvignon blanc. The characteristics of the wines are very similar, however, the sugar level is higher with Sauvignon gris, a strong argument for using it in sweet wines.

As far as cultivation practices are concerned, the production is limited at 25 Hl/hectare and the planting density must be at least 6,500 vines per hectare. In detail, the spacing between rows cannot exceed 1.90 m and the spacing between vines on the row must be at least 0.80 m. Generally, the vines have cover crops between the rows and are weeded below the row. And over the past few years, the installation of anti-frost towers are becoming more common in the fight against increasingly frequent late frosts in the Bordeaux vineyards, a consequence of climate change. Harvesting must be done by hand in successive selections, from 3 to 8 times through the vineyard, depending on the year, in order to select grapes that have reached perfect maturity, and thus obtain the best concentration of aromas. Some châteaux even harvest parts of the bunch, or even grain by grain to ensure optimum quality.

Figure 8: Noble rot on Sémillon blanc (photo John Yesberg)