333 Ecole de Montpellier

Genetic origin

This variety results from the crossbreeding of *Vitis vinifera* cv. Cabernet-Sauvignon and *Vitis berlandieri*.

Name of the variety in France (and usual name)

333 EM

Breeder\/breeder and year obtained

Gustave Foëx, 1883.

Estimated surface area of the French vineyard grafted with this rootstock and main regions of use

4 000 ha . Champagne, Charentes.

Elements of ampelographic description

The identification is based on:
- the tip of the young shoot that is open, with a piping anthocyanin coloration and a high density of prostrate hairs,
- the reddish young leaves,
- the shoots with a very ribbed surface, a circular or slightly elliptic section and no erect and prostrate hairs,
- the circular adult leaves, entire or with five lobes, with shiny blistered leaf blade, involute and twisted on the edges, a brace-shaped slightly open petiole sinus or with slightly overlapping lobes and with often limited naked petiole veins,
- the male flowers,
- the woody shoots with a very ribbed surface.

Evolution of mother vine surfaces

Year	1945	1955	1965	1975	1985	1995	2005	2015
ha	2	7	15	43	18	12	8	21

Genetic profile

Microsatellite	VVS2	VVMD5	VVMD7	VVMD27	VRZAG62	VRZAG79	VVMD25	VVMD28	VVMD32
Allele 1	137	217	231	238	194	248	238	235	239
Allele 2	147	229	239	250	220	260	250	235	257

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Resistance to soil pests

333 EM is moderately to highly tolerant to the root form of phylloxera. It is sensitive to *Meloidogyne incognita* and *Meloidogyne arenaria* nematodes.

Aptitudes for vegetative multiplication

333 EM wood production is very low (10 000 to 30 000 m/ha) and autumn climatic conditions must be favorable in order to get a proper lignification of canes. 333 EM has a moderate cutting capacity and a good grafting aptitude, but the large cane diameter may be bothersome.

Clonal selection in France

In France, the 4 certified 333 EM clones carry the numbers 260, 263, 1049 and 1105. Among those, the clone 263 is multiplied on 20 ha 53 ares of mother vines producing certified material, in 2017.

Datas are extracted from: Les chiffres de la pépinière viticole, 2017, Datas and assesment of FranceAgriMer, may 2018.

Adaptation to the environment

333 EM is characterized by its very good adaptation to limestone soils and its resistance to chlorosis. In deed, it resists up to 60% of "total" limestone, 40% of "active" limestone and an ICP of 70. This rootstock is also well adapted to drought and to temporary water excess during the spring. On the other hand, it is sensitive to chlorides. 333 EM is well adapted to shallow, dry and limestone soils.

Interaction with the graft and production objectives

333 EM gives a high vigor to grafts and provides fairly high yields. It can however sometimes promote coulure phenomenon. The first development of plants is fairly slow with this rootstock. Under not very fertile or limiting conditions, the varieties grafted onto 333 EM produces good quality products.

Bibliographic references

- Catalogue des variétés et clones de vigne cultivés en France. Collectif, 2007, Ed. IFV, Le Grau-du-Roi, France.
- Documentary collections of the Centre de Ressources Biologiques de la Vigne de Vassal-Montpellier, INRAE - Montpellier SupAgro, Marseillan, France.
- Cépages et vignobles de France, tome 1. P. Galet, 1988, Ed. Dehan, Montpellier, France.