

**Table S1.** Morphological description by Schoeneberger *et al.* (2012) of the profiles of the vineyard soils with a High (HGD) and Low (LGD) Geese Density, and of the soil of the control vineyard Without Geese (WG), Cannara (PG, central Italy).

Landform, hill; Exposure, S-SE; Slope, 5%; Altitude, 250 m a.s.l. Mean annual air temperature: 14.8°C; Mean annual precipitation, 79.4 mm; Parent material, fluvial and lacustrine sediments; Soil classification, mixed, calcareous, mesic Typic Haplustept (Soil Survey Staff, 2014).

Soil use	Horizons	Depth /cm	Colour <sup>a</sup>	Texture <sup>b</sup>	Skeleton <sup>c</sup> /%	Structure <sup>d</sup>	Consistency <sup>e</sup>	Plasticity <sup>f</sup>	Roots <sup>g</sup>	Boundary <sup>h</sup>	Other observations
WG	Ap1	0-7	2.5YR5/4	sic	<1	2fm sbk	ns	p	3vf,f	cw	Abundant CaCO <sub>3</sub> concretions.
	Ap2	7-21	2.5YR5/4	sac	<1	3fm abk	ns	sp	3vf,f	cs	Common CaCO <sub>3</sub> concretions.
	Bw	21-36	2.5YR5/4.	sic	2-3	3fm abk	s	p	2vf,f, 1m	cs	Common CaCO <sub>3</sub> and few Mn concretions.
	BC	36-54	2.5YR5/6	sic	<1	1fm sbk	ns	p	1vf	cw	Abundant CaCO <sub>3</sub> and few Mn concretions.
	C	54-64	2.5YR5/4	c	<1	1fm sbk	-	-	2vf,f, 1m	cw	Common CaCO <sub>3</sub> and few Mn concretions.
	Cg	64-74+	2.5YR6/4	sic	<1	1 sbk	-	-	2f	-	Common CaCO <sub>3</sub> and few Mn concretions.
LGD	Ap1	0-10	10YR4/3	sic	<1	3fm sbk	ss	sp	3m	cw	-
	Ap2	10-20	7.5YR4/2	c	<1	2f sbk	ss	p	1vf,f,m	cw	-
	Bw	20-27	10YR5/3	c	<1	2m abk	s	p	2vf,f	cw	-

	BC1	27-44	10YR5/6	c	<1	2m abk	vs	vp	2vf,f; 1m	cs	Few Mn concretions and reddish streaks (7.5 YR5/6)
	BC2	44-54	10YR6/4	sac	-	2m abk	s	p	2f,m; 1co	cs	Few Mn concretions and reddish streaks (7.5 YR5/6)
	C	54-69+	10YR 5/4	sic	-	1m sbk	vs	vp	1 vf,f,m,co	-	-
HGD	Ap1	0-6	10YR 4/3	cl	<1	2f sbk	ss	p	1vf,f	cs	-
	Ap2	6-15	10YR 4/2	cl	<1	2fm sbk	ss	p	1f 1co	cs	-
	Bw1	15-29	10YR 5/4	cl	<1	2fm sbk	ss	p	2 vf,f,m	cs	-
	Bw2	29-41	10YR 5/4	c	<1	2m sbk	vs	vp	1 vf,f	cs	-
	Bw3	41-54	10YR 5/4	c	1	1m sbk	vs	vp	3vf,f; 2m	cs	-
	C	54-70+	10YR 5/4	c	90	1f sbk	-	-	2v <sub>1</sub> vf	-	-

<sup>a</sup> moist and crushed, according to the Munsell Soil Colour Charts.

<sup>b</sup> sic, silty clay; sac, sandy clay; cl, clay loam; c, clay.

<sup>c</sup> volume percent of particles > 2 mm.

<sup>d</sup> 1 = weak, 2 = moderate, 3 = strong; f = fine, m = medium, c = coarse; cr = crumb, abk = angular blocky, sbk = subangular blocky.

<sup>e</sup> m=moist, fr=friable, fi=firm; w=wet, ns=not sticky, ss=slightly sticky, s=sticky, vs=very sticky.

<sup>f</sup> w=wet, np=not plastic, sp=slightly plastic, p=plastic, vp=very pastic, .

<sup>g</sup> 0 = absent, v<sub>1</sub> = very few, 1 = few, 2 = plentiful, 3 = abundant; vf = very fine, f = fine, m = medium, co = coarse.

<sup>h</sup> c = clear; w = wavy, s = smooth.