Table 1. Accessions grouped according to leaf-tip necrosis type (LTN) and their reaction to leaf rust (*Puccinia trticina*). Rating of % severity after Peterson et al. 1948).

LTN type	Rust reaction	Number	Accession name
High	Trace	20	IC536139, IC536168, EC573572, IC536220, EC573975, EC573976, EC573977, EC574115, IC536433, EC574273, EC574390, EC574426, EC574427, EC574437, EC574438, EC574444, EC574445, EC574446, EC574454, EC574627
	5	37	EC573569, IC536222, IC536431, EC574291, EC574412, EC574421, EC574428, EC574450, EC574458, EC574459, EC574460, EC574461, EC574462, EC574463, EC574475, EC574476, EC574478, EC574484, EC574485, EC574503, EC574504, EC574642,EC574690, EC574691, EC574700, EC574701, EC574702, EC574704, EC574705, EC574706, EC574707, EC574789, EC574828, EC574829, EC574830, EC574831, EC574847
	10	102	2IC536161, IC536167, IC536174, IC536176, IC536178, IC536181, IC536183, IC536187, IC536196, IC536197, IC536204, IC536216, EC573911, EC573912, EC573987, EC573988, EC573989, EC573999, IC536475, IC536503, IC536508, EC574217, EC574268, EC574271, EC574367, EC574368, EC574387, EC574397, EC574398, EC574399, EC574409, EC574410, EC574411, EC574414, EC574415, EC574422, EC574423, EC574424, EC574429, EC574447, EC574448, EC574453, EC574455, EC574456, EC574457, EC574459, EC574460, EC574464, EC574465, EC574469, EC574470, EC574471, EC574473, EC574474, EC574487, EC574488, EC574489, EC574491, EC574492, EC574495, EC574496, EC574498, EC574570, EC574594, EC574603, EC574639, EC574642, EC574690, EC574691, EC574693, EC574694, EC574712, EC574713, EC574714, EC574715, EC574716, EC574724, EC574725, EC574726, EC574727, EC574728, EC574729, EC574730, EC574735, EC574736, EC574790 , EC574817, EC574818, EC574819, EC574820, EC574821, EC574822, EC574823, EC574824, EC574825, EC574832, EC574906, EC574907, EC574908, EC574909, EC575040, EC575041
	20	15	IC536218, EC574387, EC574443, EC574468, EC574476, EC574497, EC574499, EC574501, EC574567, EC574568, EC574620, EC574826, EC574827, EC574899, EC575048
	40	2	EC573997, IC536383
	60	1	EC574569

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ITEMS FROM ITALY

THE UNIVERSITY OF BOLOGNA – COLLEGE OF AGRICULTURE
Dipartimento di Scienze e Tecnologie Agroambientali (DiSTA), Via Fanin 40, 40127 Bologna, Italy.

Resistance to cereal soilborne mosaic virus in durum wheat is recessive.

V. Vallega (CRA–QCE, Rome), P. De Vita (CRA–CER, Foggia), and C. Rubies-Autonell and C. Ratti (DiSTA, Bologna).

The type-member of the *Furovirus* genus, soil-borne wheat mosaic virus (WSBMV), was first identified in the U.S. about 80 years ago and, thereafter, reported in most of the wheat-growing areas of the world including Italy. In 2005, following the results of sequence and alignment analyses, the soilborne mosaic virus isolates prevalent in North America, Europe, and far-eastern Asia were subdivided into three distinct species within the *Furovirus* genus denominated by, respectively, soil-borne wheat mosaic virus, soil-borne cereal mosaic virus (CSBMV), and Chinese wheat mosaic virus (CWMV).

According to various reports, resistance to WSBMV and CWMV in common (hexaploid) wheat is governed by 1–3 major genes, whereas CSBMV resistance in durum (tetraploid) wheat is controlled by major genes as well by a plethora of genes with small effects. Indeed, as many as nine minor genes contributed by both parents have been detected in RILs from a single durum wheat cross. In hexaploid wheat, resistance to WSBMV and to CWMV generally is believed to be inherited as a dominant trait, and this view has been implicitly extended to CSBMV-resistance in durum wheat. Quite unexpectedly, observations by the senior author on F_1 durum wheat plants grown outdoors near Rome for

general breeding purposes suggested that at least some durum wheat cultivars carry either recessive or co-dominant CSBMV-resistance genes. In fact, F_1 plants derived from crosses between CSBMV-resistant and CSBMV-susceptible durum wheat cultivars often showed severe CSBMV symptoms even under mild disease pressure.

A six-parent, diallel cross without reciprocals was set up to verify this hypothesis. The parents included cultivars Ionio (resistant = R), Neodur (R), Duilio (moderately resistant = MR), Cirillo (susceptible = S), Valnova (S), and Simeto (moderately susceptible = MS). Cultivars Neodur and Ionio, both derived from the cultivar Edmore, are known to carry a major CSBMV-resistance gene or gene-block located on the short arm of chromosome 2B. Duilio also is known to carry one or more major CSBMV-resistance factors on 2BS, possibly the same as Neodur and Ionio (Maccaferri et al. 2011; Russo et al. in press). Based on their response in previous trials and on the results of recent genetic and molecular marker studies, all the cultivars intercrossed, including the susceptible ones, presumably carry minor resistance genes. The six parental cultivars were grown during 2008–09 in a field free of CSBMV near Foggia and intercrossed in all combinations excluding reciprocals. In the the following season, the resulting 15 F_1s were seeded on 29 October, along with their parents, in a naturally CSBMV-infected field near Bologna in plots consisting of single 1.5-m rows. Twenty seeds were sown in each row. Plots were distributed according to a randomized-block design with three replicates. Symptom-severity was rated on 7 April on a whole-plot basis using a 0–4 scale. DAS ELISA was performed on extracts from a bulk of the basal portions of the two youngest fully expanded leaves collected on 9 April from 10 plants/plot.

CSBMV-pressure was severe, as testified by the high mean symptom scores recorded for the susceptible parents (Table 1). Symptom scores and ELISA values were significantly correlated (r = 0.887; P 0.001). The nine F_1s derived from crosses between resistant and susceptible parents manifested a clearly susceptible reaction in terms of symptom severity (range = 2.5–3.4), in all cases significantly higher than that recorded for any of the three resistant parents (range = 0.6–1.0). Moreover, ELISA values for the 'R/S' F_1s (ELISA range = 0.70 – 1.12) were much closer to those recorded for the susceptible parents (ELISA range = 1.06–1.15) than for the resistant ones (range = 0.03–0.47). The noticeable difference (2.2) between the mean symptom score recorded for the 'R/S' F_1s and for the three resistant parents closely corresponds to the effect estimated for the major CSBMV-resistance QTL identified in recent studies on RILs derived from the durum wheat crosses 'Meridiano / Claudio' and 'Neodur / Cirillo'.

Table 1. Mean CSBMV symptom score (on a 0–4 scale) and mean DAS-ELISA value for the parents and F_1 hybrids of a six-parent diallel cross without reciprocals between durum wheat cultivars.

Genotype	Mean symptom score (April 7)	Mean DAS-ELISA value (April 9)
Resistant parents (3)	0.8	0.18
Resistant/Resistant F_1s (3)	0.5	0.34
Resistant/Susceptible F_1s (9)	3.0	0.87
Susceptible/Susceptible F_1s (3)	3.6	1.01
Susceptible parents (3)	3.7	1.09

The 'R/S' F_1s showed a somewhat greater degree of CSBMV-resistance than the susceptible parents both in terms of symptom severity and ELISA value, suggesting that the minor genes for CSBMV-resistance contributed by the parental cultivars were prevalently dominant. This hypothesis, however, was not validated by the response of single 'R/S' F_1s, which was quite erratic, nor by that of the 'R/S' F_1s, which was pratically identical to that of their susceptible parents.

Based on the above results, we concluded that the durum wheat cultivars Ionio, Neodur, and Duilio carry a recessive (or incompletely recessive) major CSBMV-resistance gene or gene-block, and that the six parental cultivars carry dominant, as well as recessive, modifiers that interact in disparate ways to induce small and, as yet unpredictable, modifications in the final expression of resistance in F_1 plants.

Given the close affinity between durum (genome AABB) and common wheat (genome AABBDD) as well as between WSBMV, CSBMV, and CWMV, our results on CSBMV-resistance in durum wheat are difficult to reconcile with the dominance generally reported for WSBMV and CWMV in hexaploid wheat. In this respect, it should be noted that some of the papers thus far published on the genetics of WSBMV and CWMV resistance contain obvious contradictions, and that they are all quite vague in relation to both the phenotyping criteria adopted and to the disease pressure encountered. We are presently conducting further experiments on the inheritance of CSBMV resistance using a different set of durum and common wheat cultivars of various origins.

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Response of 32 durum wheat cultivars to cereal soilborne mosaic virus in 2009.

C. Ratti, C. Rubies-Autonell (DiSTA, Bologna), A. Sarti (ASTRA, Faenza), R. Canestrale (CRPV, Imola), and V. Vallega (CRA–QCE, Rome).

Cereal soil-borne mosaic virus in Italy was first detected in the Po Valley in 1960 and now is known to be widespread throughout most of the country, particularly in the northern and central regions. Thirty-two durum wheat cultivars were grown during 2008–09 in a field with CSBMV at Cadriano, near Bologna, and evaluated for resistance on the basis of symptom severity, DAS-ELISA value and agronomic performance. The cultivars, planted on 20 November, 2008, were grown in 10-m^2 solid-seeded plots distributed in the field according to a randomized block design with three replicates. Symptom severity was evaluated on three dates (1, 9, and 14 April) using a 0–4 scale. DAS-ELISA was performed on extracts from a bulk of the basal half of the second and third youngest leaves of 10 randomly chosen plants/plot collected on 6 April, 2009.

Cereal soil-borne mosaic virus pressure during the 2008–09 season was relatively low, as testified by the mild symptom scores recorded for cultivars known for their susceptibility. The data collected, in any case, indicated that some of the cultivars assayed for the first time, particularly Canova, Karur, Liberdur, Trionfo, and Tripudio, are susceptible to CSBMV (Table 2, continued on p. 91).

Table 2. Response to cereal soil-borne mosaic virus of 32 durum wheat cultivars grown near Bologna, Italy, in 2008–09. Items with the same letter(s) are statistically similar.

Cultivar	Symptom severity score (0–4 scale)				ELISA value	Grain yield (t/ha)	Plant height (cm)	Days-to-heading (from 1 April)	Kernel weight (g)	Test weight (kg/hL)
	1 April	9 April	14 April	Mean	6 April					
Achille	2.1 ad	2.8 ab	2.7 ab	2.53	0.795 bf	5.04 bh	80.0 bf	42 bd	38.4 jk	78.6 a
Alemanno	1.1 cg	0.6 fg	0.5 eh	0.74	0.008 f	5.79 af	89.0 a	39 hj	50.4 a	75.9 ch
Anco Marzio	2.5 ab	2.7 ac	2.7 ab	2.61	0.626 cf	5.18 bg	82.7 ad	40 ef	39.2 jk	77.5 ac
Arnacoris	0.6 eg	0.1 g	0.1 gh	0.28	0.017 f	6.16 ae	81.3 be	39 hj	43.4 ei	74.7 fj
Artemide	0.9 dg	1.4 bg	1.4 bh	1.25	0.399 ef	5.27 bg	74.3 ei	40 fh	44.6 dg	74.5 gj
Biensur	0.2 g	0.1 g	0.1 gh	0.13	0.009 f	5.77 af	74.7 ei	42 bc	38.5 jk	75.0 ej
Casanova	2.3 ad	2.7 ac	2.4 ac	2.44	0.855 af	4.91 ch	77.3 ch	38 ik	50.3 a	74.7 fj
Ciccio	2.2 ad	2.5 ad	2.7 ab	2.44	1.460 ae	3.61 h	69.0 i	38 il	38.8 jk	75.5 di
Ciclope	2.4 ac	2.2 af	2.5 ac	2.34	0.953 af	4.09 gh	76.7 dh	39 gi	42.8 fi	69.8 m
Claudio	1.9 ae	2.0 af	2.3 ac	2.06	0.872 af	4.72 dh	85.7 ab	40 eg	43.5 eh	78.8 a
Creso	1.5 bg	1.1 cg	1.5 bh	1.36	0.783 bf	5.58 ag	75.3 ei	42 b	45.9 bf	77.0 ad
Duilio	0.6 eg	0.8 eg	0.1 gh	0.47	0.279 f	5.40 ag	81.0 be	38 jl	48.2 ac	76.4 bf
Dylan	0.2 g	0.1 g	0.0 h	0.09	0.043 f	6.91 a	84.0 ac	41 ce	44.4 dg	74.6 fj
Imothep	1.8 ae	1.4 bg	1.4 bh	1.56	0.008 f	6.01 ae	83.0 ad	37 l	45.3 bg	77.9 ab
Iride	1.2 bg	1.2 bg	1.1 ch	1.14	0.313 ef	6.51 ab	77.3 ch	38 il	42.1 gj	75.1 ej
Isildur	0.7 eg	0.8 dg	1.2 bh	0.89	0.273 f	5.29 bg	79.0 bg	38 jl	46.3 bf	76.7 be
Karur	2.2 ad	2.3 ae	2.1 ad	2.19	1.980 a	5.27 bg	78.3 ch	45 a	40.1 hk	72.7 kl
Latinur	0.9 dg	0.8 dg	0.7 dh	0.81	0.882 af	5.89 af	72.7 gi	41 df	43.6 eh	75.5 di
Levante	1.3 bg	1.1 cg	1.3 bh	1.24	0.305 ef	6.31 ac	80.7 be	41 ce	44.5 dg	76.2 bg
Liberdur	2.9 a	3.3 a	3.3 a	3.19	1.871 ab	4.35 fh	73.3 fi	44 a	39.1 jk	72.3 l
Minosse	1.8 ae	2.3 af	2.4 ac	2.17	0.507 df	4.94 ch	79.0 bg	38 ik	44.2 eg	78.0 ab
Neolatino	1.8 ae	1.1 cg	1.5 bh	1.47	0.632 cf	4.89 ch	78.3 ch	38 il	48.3 ac	76.3 bg

Table 2. Response to cereal soil-borne mosaic virus of 32 durum wheat cultivars grown near Bologna, Italy, in 2008–09. Items with the same letter(s) are statistically similar.

Normanno	0.4 fg	0.7 eg	0.3 fh	0.46	0.457 ef	6.27 ad	78.0 ch	40 fh	46.8 be	75.2 ej
Orobel	2.3 ad	2.7 ac	1.8 ae	2.25	1.712 ac	4.41 fh	77.3 ch	45 a	44.8 cg	73.4 jl
Pr22d89	0.9 dg	0.7 eg	1.3 bh	0.94	0.314 ef	4.97 bh	78.0 ch	37 kl	48.6 ab	77.1 ad
Principe	1.5 bg	1.7 bg	1.6 bg	1.58	1.709 ac	4.95 ch	82.7 ad	38 jl	47.9 ad	73.9 il
Saragolla	1.2 bg	1.0 cg	0.7 dh	0.96	0.017 f	5.52 ag	74.7 ei	38 jl	40.4 hj	75.7 ci
Severo	1.4 bg	1.2 bg	1.7 bf	1.42	0.395 ef	5.78 af	84.0 ac	40 eg	36.7 k	75.0 ej
Simeto	2.2 ad	2.1 af	2.3 ac	2.17	1.899 ab	4.82 ch	71.7 hi	39 gi	48.3 ac	73.5 jl
Tirex	0.7 eg	0.2 g	0.4 eh	0.42	0.017 f	5.86 af	80.7 be	38 ik	42.7 fi	77.9 ab
Trionfo	1.8 af	2.1 af	2.3 ac	2.06	1.718 ac	4.69 eh	78.0 ch	42 b	39.9 ik	74.3 hk
Tripudio	1.8 af	2.1 af	2.7 ab	2.17	1.657 ad	5.02 bh	77.0 ch	41 df	40.3 hj	75.9 ch
Mean	1.47	1.49	1.53	1.49	0.743	5.32	78.6	39.8	43.7	75.5
Minimum	0.17	0.05	0.00	0.09	0.008	3.61	69.0	37.0	36.7	69.8
Maximum	2.92	3.33	3.33	3.19	1.980	6.91	89.0	44.7	50.4	78.8

Mean symptom severity score was significantly correlated with ELISA value and grain yield, but not with the other plant characters measured (Table 3). Regression analysis indicated that the 12 cultivars showing symptom scores between 2.0 and 3.0 suffered a 25% mean grain yield loss.

Table 3. Simple correlation coefficients between mean symptom severity, mean ELISA value, and various agronomic characters for 32 durum wheat cultivars grown in a field with cereal soil-borne mosaic virus near Bologna, Italy, during 2008–09. Items with ** are significantly correlated; all others are nonsignificant.

	ELISA value	Grain yield	Plant height	Heading date	Kernel weight	Test weight
Symptom severity	0.729**	–0.751**	–0.248	0.314	–0.276	–0.188
ELISA value	—	–0.663**	–0.407**	0.500**	–0.160	–0.473**

Response of 33 durum wheat cultivars to cereal soilborne mosaic virus in 2010.

C. Rubies-Autonell and C. Ratti, (DiSTA, Bologna), A. Sarti (ASTRA, Faenza), R. Canestrale (CRPV, Imola), and V. Vallega (CRA–QCE, Rome).

Thirty-three durum wheat cultivars were grown during 2009–10 in a field with CSBMV at Cadriano, near Bologna, and evaluated for resistance on the basis of symptom severity, DAS-ELISA value, and agronomic performance. The cultivars, planted 30 October, 2009, were grown in 10-m^2 solid-seeded plots distributed in the field according to a randomized block design with three replicates. Symptom severity was evaluated on three dates (17 and 25 March and 7 April) using a 0–4 scale. DAS-ELISA was performed on extracts from a bulk of the basal half of the second and third youngest leaves of 10 randomly chosen plants/plot collected on 26 March and 9 April, 2010.

The cultivars Dylan and Biensur showed very mild symptoms and relatively low ELISA values; both produced high grain yields, superseeded only by those recorded for the moderately resistant cultivar Levante (Table 4, p. 92). Relatively low symptom scores and ELISA values, as well as relatively high grain yields, were recorded also for cultivars Duilio, Saragolla, Alemanno, Pharaon, Meridiano, and Svevo.

Mean ELISA value and mean symptom severity score were significantly correlated (0.736**), and both resistance parameters were significantly correlated with all the agronomic traits considered except test weight (Table 5, p. 92). Regression analysis indicated that cultivars showing symptom scores between 3.0 and 3.8 (Table 6, p. 93) suffered a 53% mean grain yield loss, as well as severe reductions in plant height (31%) and kernel weight (16%).

Table 4. Response to cereal soil-borne mosaic virus of 33 durum wheat cultivars grown near Bologna, Italy, in 2009–10. Items with the same letter(s) are statistically similar. Symptom severity was rated on a 0–4 scale and are the mean of three dates.

Cultivar	Symptom severity score			ELISA value	Grain yield (t/ha)	Plant height (cm)	Days-to-heading (from April 1)	Kernel weight (g)	Test weight (kg/hl)
	26 March	9 April	Mean						
Achille	3.78	0.981 ad	1.160 a	1.071	2.77 ik	60.0 jl	44 ab	36.0 pq	75.5 ag
Alemanno	1.36	0.915 ae	0.310 il	0.613	4.31 bh	85.0 a	37 hl	52.1 a	73.3 di
Anco Marzio	3.44	1.085 ad	1.066 ab	1.076	2.44 jk	61.7 hl	41 cd	39.4 mp	72.4 hi
Arnacoris	2.82	0.751 af	0.358 il	0.555	3.53 ej	75.7 be	39 ei	43.9 ek	72.3 hi
Aureo	3.16	0.611 cf	0.559 ek	0.585	2.58 jk	82.0 ab	40 dg	40.3 jo	73.0 fi
Biensur	0.69	0.723 af	0.384 hl	0.554	5.36 ab	79.0 ac	41 cd	40.0 lo	74.7 bh
Cannavaro	3.35	1.127 ab	1.156 a	1.142	3.28 gk	68.3 fh	44 ab	48.0 bd	72.0 hi
Ciccio	3.17	1.099 ac	1.095 a	1.097	2.28 k	65.0 gk	36 jl	38.0 oq	73.7 ch
Claudio	3.61	1.062 ad	0.912 af	0.987	0.87 l	49.7 m	45 ab	41.8 ho	73.0 fi
Creso	3.44	1.023 ad	0.957 ae	0.990	2.42 jk	58.3 kl	44 ab	45.4 bh	76.7 ab
Duilio	1.04	0.638 bf	0.259 il	0.449	4.92 bd	82.7 ab	35 km	48.4 bc	74.7 bh
Dylan	0.89	0.605 cf	0.195 jl	0.400	5.19 ac	81.7 ab	40 cf	44.7 ci	73.8 ch
Grazia	3.32	1.128 ab	1.130 a	1.129	2.41 jk	66.3 gj	41 ce	35.2 q	72.9 fi
Ignazio	2.87	0.641 bf	0.623 ci	0.632	4.15 bh	78.7 ad	40 dg	49.1 ab	76.8 ab
Imhotep	3.14	0.961 ad	0.548 ek	0.755	3.96 di	76.3 be	35 lm	45.6 bh	77.6 a
Iride	2.33	0.581 df	0.391 gl	0.486	4.39 bh	74.3 cf	35 km	42.4 gn	78.0 a
Karur	3.12	1.173 a	1.096 a	1.135	3.92 di	60.3 il	46 a	41.4 io	73.5 dh
Latinur	2.12	1.028 ad	0.806 ag	0.917	3.28 gk	65.0 gk	38 fj	41.4 io	70.6 i
Levante	1.31	0.395 f	0.001 l	0.198	6.24 a	82.0 ab	39 dh	44.9 ci	73.9 ch
Liberdur	3.62	1.144 ab	1.047 ab	1.096	3.53 ej	57.0 l	44 ab	40.1 ko	76.3 ac
Meridiano	1.89	0.873 af	0.447 gk	0.660	4.57 bf	83.0 ab	35 km	47.5 bf	76.0 ad
Minosse	2.70	0.983 ae	0.784 ah	0.884	2.52 jk	67.3 fi	36 il	42.9 gm	73.2 ei
Neolatino	2.17	0.839 af	0.667 bi	0.753	3.19 hk	79.3 ac	35 lm	47.7 be	75.8 ae
Normanno	2.73	0.958 ae	0.532 fk	0.745	3.43 fk	71.7 dg	39 ei	43.9 ej	73.2 ei
Pharaon	1.53	0.454 ef	0.179 kl	0.317	4.52 bg	78.3 ad	37 il	45.2 ci	73.8 ch
Pr22d89	2.61	1.110 ac	0.969 ad	1.040	4.10 ch	70.3 eg	37 gk	44.7 ci	76.4 ac
Saragolla	1.22	0.909 ae	0.601 dj	0.755	4.71 be	75.7 be	35 km	44.1 di	72.7 gi
Severo	3.67	0.704 af	1.060 ab	0.882	3.56 ej	58.7 kl	42 bc	38.9 np	78.0 a
Simeto	2.56	1.186 a	1.018 ac	1.102	3.59 ej	68.0 fh	38 fj	45.9 bg	73.2 di
Svevo	1.94	0.751 af	0.431 gk	0.591	4.38 bh	84.7 a	33 m	44.1 di	75.7 af
Tirex	2.36	1.037 ad	0.504 fk	0.771	4.53 bg	79.7 ac	35 lm	46.2 bg	76.8 ab
Trionfo	3.12	1.110 ac	1.093 a	1.102	3.56 ej	66.0 gj	41 cd	40.0 lo	75.7 af
Tripudio	2.93	1.139 ab	1.086 a	1.113	3.65 ej	68.3 fh	41 cd	43.8 fl	77.0 ab
Mean	2.54	0.901	0.710	0.806	3.70	71.5	39	43.4	74.6
Minimum	0.69	0.395	0.001	0.198	0.87	49.7	33	35.2	70.6

Table 5. Simple correlation coefficients between mean symptom severity, mean ELISA value, and various agronomic characters for 33 durum wheat cultivars grown in a field with cereal soil-borne mosaic virus near Bologna, Italy, during 2009–10. Items with ** are significantly correlated; all others are nonsignificant.

	ELISA value	Grain yield	Plant height	Heading date	Kernel weight	Test weight
Symptom severity	0.736**	–0.779**	–0.757**	0.535**	–0.470**	–0.139
ELISA value	—	–0.669**	–0.777**	0.491**	–0.420*	–0.047

Table 6. Estimated mean effects of cereal soil-borne mosaic virus on 33 durum wheat cultivars with different disease severity grown in a field near Bologna, Italy, during 2009–10.

Disease score	Number of cultivars	Grain yield loss		Plant height reduction		Kernel weight reduction		Heading delay
		t/ha	%	cm	%	g	%	
0.00–1.00	2	0.82	13	11.6	13	6.2	13	7
1.01–2.00	7	1.29	21	10.3	11	1.9	4	2
2.01–3.00	11	2.43	40	19.4	21	3.8	8	4
3.01–3.80	13	3.20	53	28.1	31	7.8	16	8

Response of 31 durum wheat cultivars to cereal soilborne mosaic virus in 2011.

V. Vallega (CRA–QCE, Rome), C. Rubies-Autonell and C. Ratti, (DiSTA, Bologna), A. Sarti (ASTRA, Faenza), and R. Canestrale (CRPV, Imola).

Thirty-one durum wheat cultivars were grown during 2010–11 in a field with CSBMV at Cadriano, near Bologna, and evaluated for resistance to this pathogen on the basis of symptom severity and DAS-ELISA readings. Seven of the cultivars (Dorato, Ismur, Kanakis, Ramirez, Sculptur, Torrese, and Yelowdur) had not been assayed for CSBMV-resistance before. The cultivars were planted 9 November, 2010, in 10-m^2 solid-seeded plots distributed in the field according to a randomized block design with three replicates. DAS-ELISA was performed on extracts from a bulk of the basal half of the first fully developed leaf of 10 randomly chosen plants/plot collected on 24 April, 2011. Because plant stunting was neglible and foliar mosaic symptoms became severe only towards the end of March, symptom severity was rated late in the season (4 and 24 April) and solely on the basis of foliar mosaic. Due to fund scarcity, grain yield and other agronomic characters were not measured.

ELISA value and mean symptom severity score were closely correlated (0.569**) but far less than in seasons characterized by an early appearance of severe visible CSBM-symptoms. As a matter of fact, some cultivars, particularly Anco Marzio, Creso, and Imhotep, exhibited a resistant response to CSBMV in terms of ELISA value yet a susceptible or moderately susceptible reaction in terms of visible symptoms (Table 7). These three cultivars were classified as susceptible or moderately susceptible in previous trials. Cultivars Sculptur and Yelodur, assayed for the first time, also showed discrepancy in response to severity of visible symptoms and ELISA value. Among the other cultivars tested for the first

Table 7. Response to cereal soil-borne mosaic virus of 31 durum wheat cultivars grown near Bologna, Italy, in 2010–11. Symptom severity was rated on a 0–4 scale. Values with the same letter(s) are statistically similar.

Cultivar	Symptom severity score			ELISA value
	4 April	24 April	Mean	24 April
Achille	2.33 ag	2.33 ag	2.34 af	0.619 be
Anco Marzio	3.08 ac	2.17 ai	2.63 ae	0.007 e
Arnacoris	1.58 ei	2.17 ai	1.88 dg	0.168 de
Biensur	0.33 j	0.00 k	0.17 i	0.032 e
Ciccio	2.17 bh	2.92 ac	2.54 ae	1.126 ad
Claudio	2.58 ae	1.92 bj	2.25 af	0.667 be
Creso	2.83 ad	2.33 ag	2.59 ae	0.263 ce
Dorato	3.33 ab	2.83 ad	3.08 ab	0.528 be
Duilio	1.75 dh	2.49 af	2.12 bf	0.014 e
Dylan	2.00 ch	2.25 ah	2.13 bf	0.002 e
Grazia	3.00 ac	3.08 a	3.04 ac	1.375 ab
Imhotep	2.83 ad	2.67 ae	2.75 ad	0.007 e
Iride	1.75 dh	1.50 fj	1.63 eh	0.070 e
Ismur	3.42 a	3.00 ab	3.21 a	1.747 a
Kanakis	1.25 gj	1.50 fj	1.38 fh	0.006 e
Karur	2.17 bh	1.92 bj	2.05 cf	0.929 ae
Latinur	2.50 af	2.42 ag	2.46 ae	0.601 be
Levante	2.58 ae	1.67 ej	2.13 bf	0.001 e
Liberdur	3.08 ac	3.08 a	3.09 ab	1.702 a
Meridiano	1.08 hj	1.00 j	1.04 gh	0.064 e
Neolatino	1.33 fj	1.92 bj	1.63 eh	0.075 e
Normanno	1.67 di	1.08 ij	1.38 fh	0.604 be
Pharaon	2.17 bh	1.67 ej	1.92 dg	0.003 e
Ramirez	0.58 ij	1.17 hj	0.88 hi	0.002 e
Saragolla	2.08 ch	1.83 cj	1.96 dg	0.047 e
Sculptur	2.42 ag	1.75 dj	2.09 bf	1.183 ac
Simeto	3.00 ac	2.08 aj	2.55 ae	0.877 ae
Svevo	2.00 ch	2.08 aj	2.04 cf	0.008 e
Tirex	2.00 ch	1.75 dj	1.88 dg	0.009 e
Torrese	2.08 ch	1.33 gj	1.71 eh	0.008 e
Yelodur	2.58 ae	2.00 aj	2.29 af	0.001 e
Mean	2.18	2.00	2.09	0.411
Minimum	0.33	0.00	0.17	0.001
Maximum	3.42	3.08	3.21	1.747

time, Kanakis, Ramirez, and Torrese showed high levels of CSBMV resistance, whereas Ismur and Dorato were susceptible.

All cultivars classified as resistant or moderately resistant in previous trials exhibited comparable reactions in 2011, and consistent responses also were observed for all those previously classified as susceptible or moderately susceptible except for Anco Marzio, Creso, and Imhotep, which expressed a susceptible reaction only in terms of symptom expression.

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CEREAL QUALITY RESEARCH UNIT (CRA) OF THE ITALIAN RESEARCH COUNCIL
Centro di ricerca per la valorizzazione qualitativa dei cereali, Via Cassia 176, 00191 Roma, Italy.

Comparison between bread wheat and barley in the inner hillside of south-central Italy.

Mauro Fornara, Massimiliano Camerini (University of Molise, Department S.A:V.A), Michelina Colonna (ARSIAM–Molise), Carlo Rossi, Ferdinando Sereni, and Fabrizio Quaranta.

In 2009 and 2010, field experiments were carried out in Colletorto, a location in the Molise region (41°40' N), an inner hill environment (515 masl) surrounded by the Central Apennine Mountain Range. In this location, 14 bread wheat cultivars and 19 barley cultivars for livestock feeding are tested yearly. Trials are in a randomized complete block design with three replications. Bread wheat cultivars are catalogued according with the Synthetic Quality Index method (Indice Sintetico di Qualità, ISQ), from the strongest type, FF (frumento di forza, improver wheat), particularly used for manufacturing products with a strong and well-leavened structure, to the weakest type, FAU (frumento per altri usi, wheat for other purposes). The intermediate wheat categories, FPS (frumento panificabile superiore, superior bread making wheat) and FP (frumento panificabile, ordinary bread making wheat), present properties suitable for ordinary bread making. The average yields for the period were similar for both crops (4.15 t/ha for bread wheat and 4.19 t/ha for barley (Table 1, p. 95)). An overall yield reduction in 2009, compared to 2010, was observed for both barley and bread wheat. Five bread wheat genotypes (Epidoc, Exotic, Blasco, Genesi, and Adelaide) reached a yield greater than 4.5 t/ha with yield indices higher than 100 in every year. Among these cultivars, Blasco and Adelaide showed a very interesting test weight average (84.8 kg/hL and 82.1 kg/hL, respectively), a character very important for milling industry.

Seven barley cultivars (Estival, Oleron, Shangrila, Mattina, Campagne, Calanque, and Aldebaran) exceeded a yield of 4.5 t/ha, with yield indicies higher than 100 in each year. Among these, only Calanque exceeded a 70 kg/hL average test weight value.