

Quality of French soft wheats 2009 harvest

> EDITION October 2009



... Protein classes / (w) Baking strength / Hagberg ...

..... € > -12% > -250
10.5 - 11.5% according to contract specifications
> -220...



Harvest 2009: large volume and quality suitable for all needs

With 37.5 million tonnes of soft wheat harvested this year, the sector can confirm its position as a major supplier on international markets.

The quality of the wheat is high: over half of the soft wheat is of superior quality (classes E and 1), and 70% has a protein content over 11%. These wheats, with a high specific weight, satisfactory baking strength and good breadmaking behaviour, will meet the requirements of millers; the other wheats will be well suited for animal feed.

High specific weight

The specific weight is high, with a national average of 77.1kg/hl. Over 70% of the harvest is above the commercial threshold of 76kg/hl.

With an average of 13.5%, the water content is perfectly adequate for storing the grains in good conditions. 2009 is an average year in terms of proteins, with an 11.3% content nationally, slightly down on 2008. However, 70% of the production is above the 11% threshold.

The weather towards the end of the harvest will have had little effect on the Hagberg values, most of which remain high: almost all of the French yield recorded Hagberg values of over 220 seconds.

The French cereal sector has been concentrating on providing quality for many years now.

92% of sown land is used for bread wheats resulting from stringent variety selection procedures for increasingly diversified markets.

20 million tonnes of top-of-the-range wheats

Around 1 million tonnes are very high quality E class soft wheats, and 19 million tonnes are class 1, which means the quality is very good – in short, 20 million tonnes of top-of-the-range wheat. In addition to this, there are 14 million tonnes of class 2 good international quality wheats.

The 2009 harvest produced a total volume of 3.5 million tonnes of class 3 wheats which will be taken up by animal feed manufacturers.

Thanks to the complete range of harvested wheats, this harvest will enable all our customers' requirements to be met, on the domestic European market and for export to third countries.

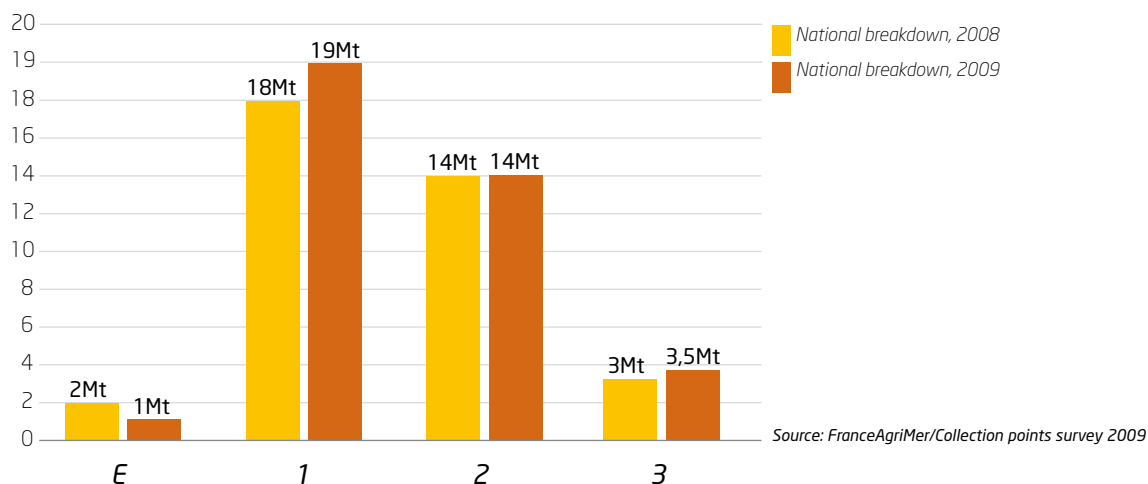
37.5 million tonnes of soft wheat harvested in 2009 including...

20 million tonnes of top-of-the-range wheat



20 MILLION TONNES OF TOP-OF-THE-RANGE WHEATS. France harvested 37.5 million tonnes in 2009. This harvest is of satisfactory quality with 20 million tonnes of top-of-the-range wheats: 2% of the wheats are in the exceptional class, E, and 50% in class 1. 38% are in class 2.

millions of tonnes



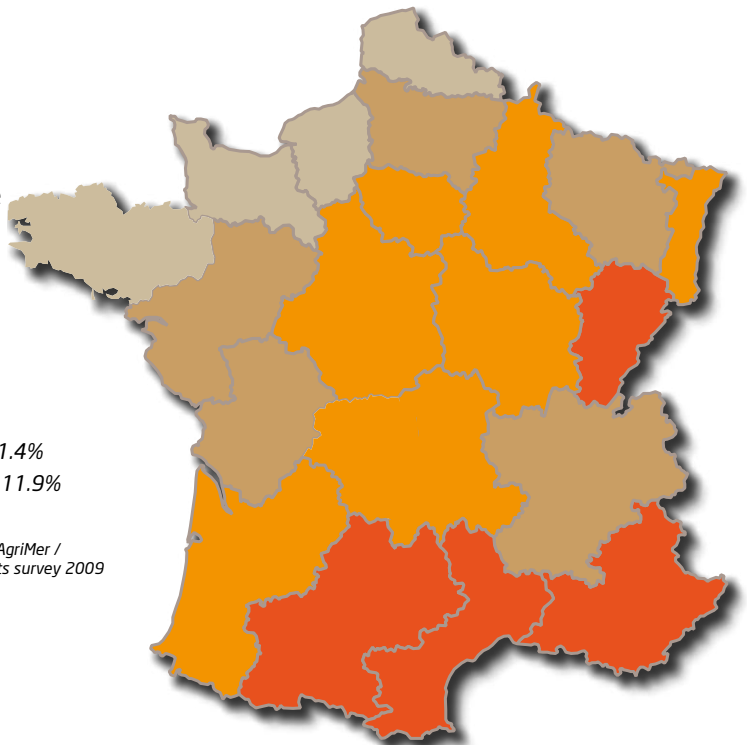
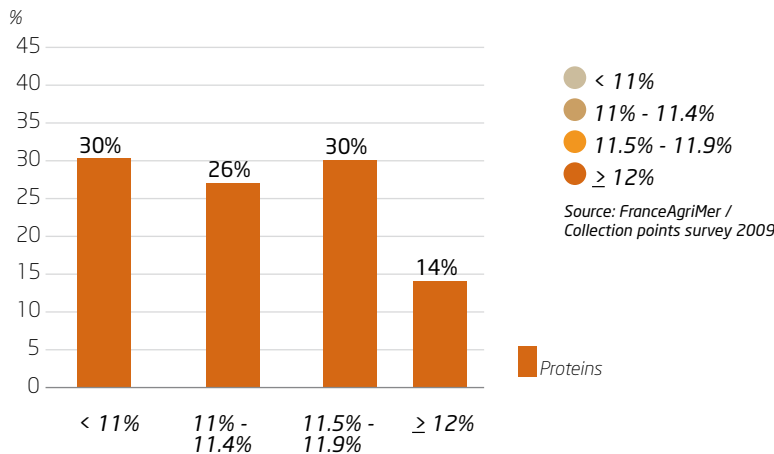
CLASSIFICATION TABLE

Classes	Proteins	(w) Baking strength	Hagberg	2009 breakdown
E	≥ 12%	≥ 250	≥ 220	2%
1	11 - 12.5%	160 - 250	≥ 220	50%
2	10,5 - 11.5%	according to contract specifications	≥ 180	38%
3	< 10.5%	not specified	not specified	10%

Proteins: (N x 5.7)% M.S.
 W: 10-4 joules/g
 Hagberg value, seconds

Average protein content of 11.3%

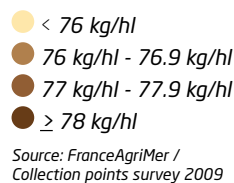
• In 2009, the average protein content was 11.3%, which is slightly lower than that recorded in 2008. The protein content shows a more uniform distribution around the mean than in 2008. In all, protein content is above 11% for 70% of wheats.



Very good specific weights

• The average specific weight for the 2009 harvest is 77.1 kg/hl, slightly down on 2008, but still at a very good level. Regional averages range between 73.9 and 81.1 kg/hl. 32% of wheats are above 78kg/hl.

71% the French harvest is above the commercial threshold of 76 kg/hl



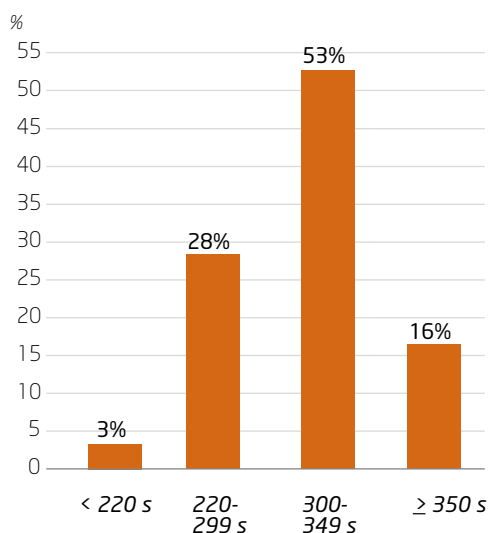


Very high Hagberg falling number

• The 2009 recorded very high Hagberg values, showing the absence of germination. Almost all the harvest was in excess of 220 seconds. A small amount, some 3% of the soft wheat harvested, recorded Hagberg values of less than 220 seconds.

 Hagberg falling index





Source: FranceAgriMer / Collection points survey 2009



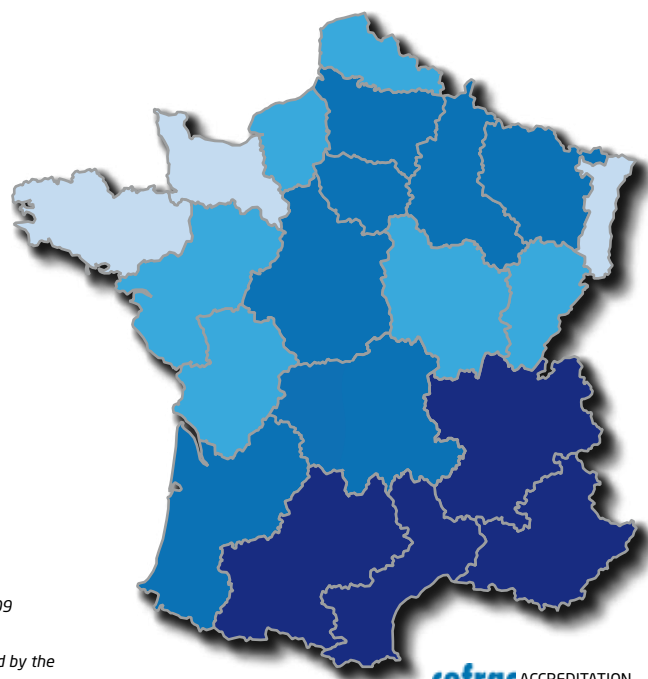
Adequate water content

• With a national average of 13.5% - slightly better than in 2008 - the grains have a water content which is perfectly adequate for satisfactory storage. Water content was in excess of 14% in only 3 out of 20 regions, located mainly in the north, with a maximum of 14.3%.

13.5% water content: the national average for the 2009 harvest

-  < 13%
-  13% - 13.4%
-  13.5% - 13.9%
-  ≥ 14%

Source: FranceAgriMer / Collection points survey 2009



The analyses of water content, specific weight and Hagberg falling index conducted by the FranceAgriMer laboratory are covered by Cofrac accreditation no. 1-2112.



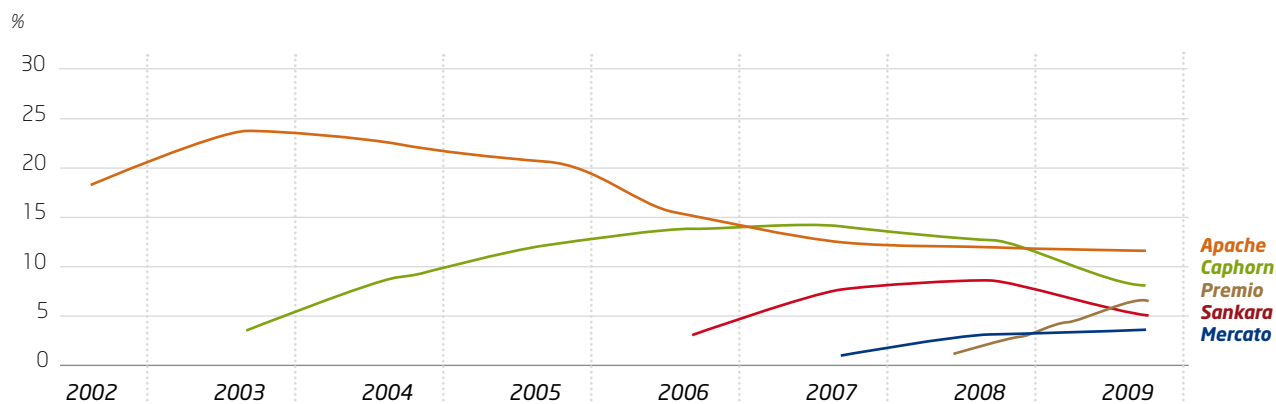


Diversity of varieties

• Breadmaking wheats cover 92% of sown areas with 78% superior and improver breadmaking wheats. Wheats for other purposes, mainly for fodder, but also for biscuits, account for 8% of the national surface area. Nine of the top ten varieties cultivated are superior breadmaking wheats. Varietal choice is becoming even more diversified: the top ten varieties grown cover 46.5% of surface areas in 2009 compared to 50% in 2008.

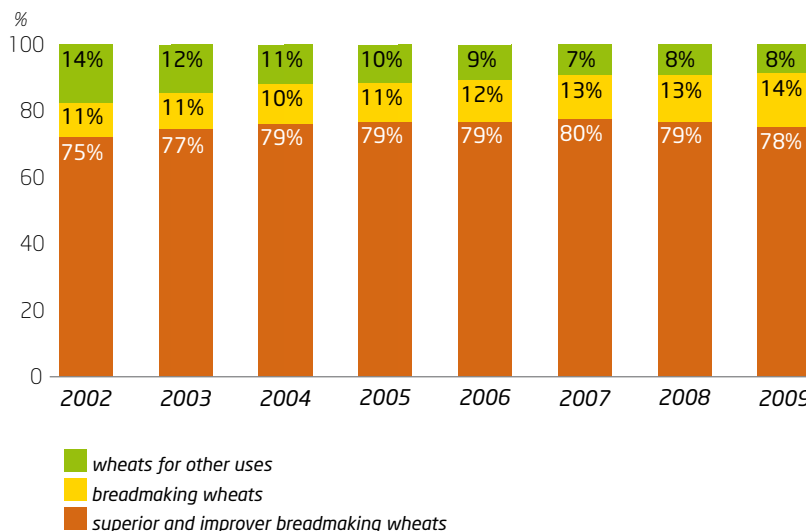
92% of surface area is dedicated to breadmaking wheats

The five most cultivated varieties



Source : FranceAgrimer / Variety breakdown survey 2009

Breadmaking wheats predominate

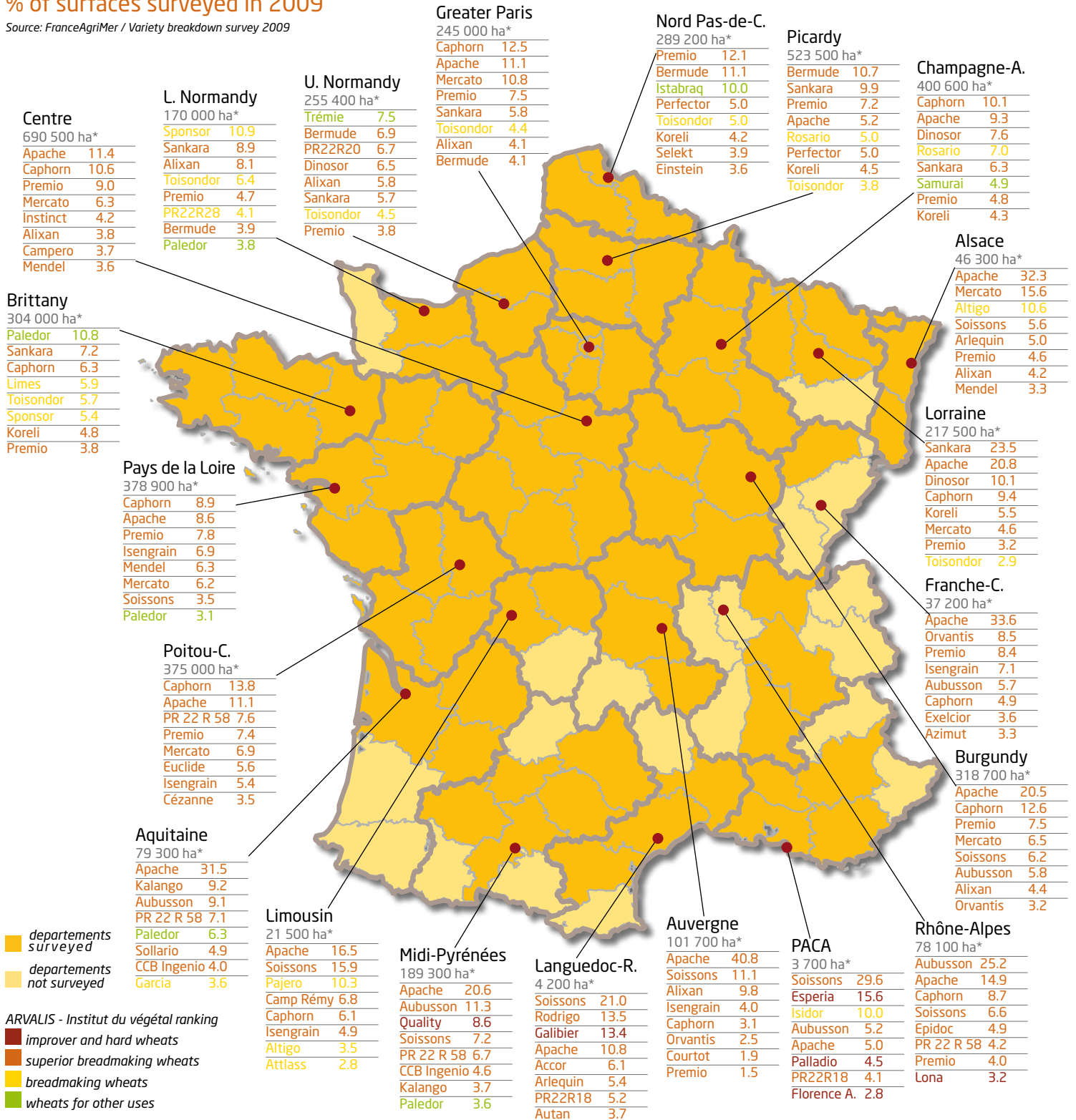


Source : FranceAgrimer / Variety breakdown survey 2009

Top 8 varieties by region

% of surfaces surveyed in 2009

Source: FranceAgriMer / Variety breakdown survey 2009



* Estimated surface areas for wheat in the départements surveyed / SSP - August 2009



Breadmaking varieties from the 2009 harvest

The survey dealt with wheats sampled on the farm at the time of harvest. The scope of the survey covers 53 départements grouped into 17 regions representing 94% of the national surface area for soft wheat. The technological criteria are measured for varieties of breadmaking wheats. Regional varietal mixtures consist of at least 4 elementary samples for which the varietal identity was monitored.

TECHNOLOGICAL CHARACTERISTICS

Varieties/regions	Surface area / 1000 hectares	Hardness	Proteins (N x 5.7)% MS	Zeleny ml	Hagberg s	Moist gluten %	Gluten index	W	G	P/L	ie	Hydration %	Stability Min. Mixolab®	Hydration %	Volume cm³	Total score/300
ALDRIC*																
CENTRE SOUTH	18.4	57	11.4	34	353	24.6	70	190	21.5	0.66	56.7	54.4	3.5	58.9	1 669	275
ALIXAN*																
AUVERGNE	10.3	56	11.2	33	394	21.8	92	175	16.8	1.39	55.2	54.7	1.5	59.9	1 675	277
NORMANDY	28.8	63	10.4	31	382	18.8	98	176	15.6	1.84	53.2	55.4	2.0	58.9	1 523	258
APACHE*																
ALSACE	15.0	48	11.0	31	348	21.6	78	158	19.8	0.76	51.7	53.3	2.0	56.7	1 646	241
AQUITAINE	22.8	59	11.1	27	385	22.1	86	155	21.9	0.53	52.0	52.8	3.0	57.1	1 531	274
AUVERGNE	45.8	55	11.7	30	377	24.9	62	168	22.4	0.53	51.9	53.9	7.0	56.9	1 531	210
BURGUNDY/FR.-C.	77.8	53	11.8	34	324	25.0	73	168	22.3	0.56	50.4	54.9	4.5	56.3	1 690	260
CENTRE NORTH	41.7	45	11.4	32	389	23.9	59	153	22.3	0.49	52.7	52.7	5.0	57.1	1 666	226
CENTRE SOUTH	40.6	46	11.3	30	357	23.3	66	166	22.7	0.50	52.3	53.1	4.0	57.1	1 629	249
CHAMPAGNE-A.	37.4	45	11.1	31	323	22.1	64	146	21.5	0.55	50.8	53.5	4.0	56.1	1 643	250
GREATER PARIS	27.2	47	11.8	34	352	25.1	65	197	24.0	0.48	54.6	53.8	6.0	57.0	1 568	241
LORRAINE	45.2	49	11.4	34	310	22.9	75	151	23.8	0.39	52.0	53.0	4.5	57.0	1 623	244
MIDI-PYRÉNÉES	39.0	57	10.9	26	397	21.5	80	151	22.1	0.51	51.2	51.6	4.5	56.5	1 605	266
PAYS DE LA LOIRE	32.5	53	11.3	31	383	21.7	87	172	20.4	0.76	50.2	•	•	56.0	1 589	266
PICARDY	27.4	47	10.5	30	366	21.5	92	166	23.0	0.48	52.6	51.4	4.0	56.1	1 588	249
POITOU-CHARENTES	42.3	64	11.4	31	377	22.8	73	196	21.2	0.76	50.8	55.7	7.5	57.9	1 496	251
RHÔNE-ALPES	11.8	57	11.2	26	356	22.9	62	158	23.0	0.49	48.6	53.1	6.5	57.9	1 531	213
AUBUSSON*																
AQUITAINE	6.6	60	10.0	24	411	17.9	89	138	21.4	0.54	48.3	•	•	56.7	1 641	257
MIDI-PYRÉNÉES	21.3	61	11.9	31	398	23.7	58	168	25.7	0.36	49.0	52.2	7.5	56.9	1 544	191
RHÔNE-ALPES	19.8	68	10.8	29	349	21.3	79	181	21.6	0.70	47.8	54.4	6.0	57.7	1 780	249
BERMUDE*																
NORD-PAS DE CALAIS	32.1	60	10.4	32	357	18.7	95	163	17.4	1.21	50.6	•	•	57.7	1 629	271
NORMANDY	24.4	59	9.9	30	252	17.0	97	150	17.4	1.08	52.4	51.5	1.5	57.1	1 550	263
PICARDY	56.2	53	10.0	33	358	17.0	97	156	17.2	1.13	55.2	51.9	1.5	57.1	1 714	270
CAPHORN*																
BURGUNDY/FR.-C.	42.0	59	12.0	47	272	21.5	97	228	19.4	1.09	56.5	57.7	2.5	58.9	1 895	291
BRITTANY	19.2	53	10.9	43	279	18.1	99	202	17.1	1.49	56.0	55.6	1.5	58.9	1 728	274
CENTRE NORTH	46.1	58	11.6	45	356	21.5	97	228	17.8	1.42	59.9	57.1	2.5	59.0	1 918	281
CENTRE SOUTH	31.2	58	12.6	51	329	24.6	91	262	21.2	0.90	59.3	57.7	6.0	59.9	1 960	293
CHAMPAGNE-A.	40.6	61	12.8	54	242	24.4	94	284	21.0	0.99	61.1	58.0	3.5	58.9	1 980	285
GREATER PARIS	30.7	57	12.0	47	252	23.0	96	273	20.8	1.00	60.2	57.2	2.0	58.7	1 771	261
LORRAINE	20.5	63	11.5	48	236	20.4	99	225	17.9	1.40	57.7	57.4	2.0	57.7	1 753	273
PAYS DE LA LOIRE	33.7	62	11.7	41	365	21.2	96	237	17.4	1.64	58.1	57.2	2.0	60.7	1 829	270
POITOU-CHARENTES	52.6	78	11.6	42	378	21.3	98	249	17.9	1.55	57.3	58.2	5.0	58.9	1 850	281
DINOSOR																
CHAMPAGNE-A.	30.3	50	11.4	38	377	21.2	87	162	19.8	0.76	53.5	•	•	56.7	1 755	280
NORMANDY	18.8	57	10.8	34	400	19.6	97	172	16.8	1.39	53.4	53.0	1.5	58.3	1 543	264
EUCLIDE*																
POITOU-CHARENTES	21.3	79	10.8	28	379	21.3	83	184	20.3	0.87	48.1	57.2	8.0	60.5	1 418	204

Varieties/regions	Surface area / 1000 hectares	Hardness	Proteins (N x 5.7)% MS	Zeleny ml	Hagberg S	Moist gluten %	Gluten index	W	G	P/L	ie	Hydration %	Stability Min. Mixolab®	Hydration %	Volume cm³	Total score/300
GALIBIER*																
CENTRE NORTH	15.0	65	14.7	65	383	31.6	86	353	22.8	0.86	67.0	57.8	11.5	•	•	•
INSTINCT																
CENTRE NORTH	23.3	63	11.6	36	345	24.0	83	184	22.7	0.51	58.4	53.0	1.5	57.3	1 694	279
ISENGRAIN																
CENTRE SOUTH	15.8	41	11.3	31	335	19.9	95	173	20.4	0.67	60.8	52.8	2.0	56.3	1 676	275
PAYS DE LA LOIRE	26.1	48	10.6	26	361	18.2	97	157	18.6	0.83	59.3	52.4	1.5	56.5	1 600	264
POITOU-CHARENTES	20.5	61	11.1	31	374	18.5	99	204	19.4	0.93	60.6	53.9	1.5	58.7	1 648	280
KORELI																
CHAMPAGNE-A.	17.2	64	11.3	39	372	21.6	97	223	17.2	1.65	53.8	59.1	5.0	60.7	1 629	271
PICARDY	23.7	64	11.2	37	376	22.3	94	210	17.7	1.44	53.4	•	•	60.7	1 623	268
MENDEL*																
CENTRE NORTH	20.5	52	11.9	38	385	24.7	69	181	23.9	0.47	52.4	53.8	2.0	58.0	1 706	249
PAYS DE LA LOIRE	23.7	53	10.7	32	422	19.8	91	164	18.8	0.93	52.7	53.0	1.5	55.7	1 714	275
MERCATO																
ALSACE-LORRAINE	17.3	52	12.2	34	283	22.8	90	196	20.4	0.77	58.5	53.3	2.0	57.1	1 781	272
BURGUNDY/FR.-C.	21.1	50	11.4	33	336	20.1	98	188	19.4	0.87	60.2	52.7	1.5	57.0	1 835	288
CENTRE NORTH	34.0	53	11.6	33	350	21.7	95	179	18.4	0.99	61.3	53.2	2.5	57.0	1 773	281
GREATER PARIS	26.5	52	11.9	33	330	22.0	93	200	20.4	0.77	60.9	52.5	2.5	57.7	1 726	273
POITOU-CHARENTES	26.2	71	11.7	31	360	21.1	96	204	19.4	0.99	56.1	54.9	5.0	57.7	1 570	272
PERFECTOR																
PICARDY	26.2	61	10.7	31	361	22.7	74	158	17.9	1.06	50.2	53.9	2.0	57.9	1 548	246
PR22R20																
NORMANDY	18.0	65	10.9	32	362	21.1	87	181	16.8	1.47	52.6	55.7	2.5	59.3	1 531	253
PR22R58																
MIDI-PYRÉNÉES	12.7	52	11.7	30	358	21.3	95	167	23.5	0.42	56.2	51.0	7.0	56.9	1 416	183
POITOU-CHARENTES	29.1	62	12.0	37	363	22.6	94	217	21.4	0.73	59.0	55.3	7.5	56.7	1 485	227
PREMIO*																
BURGUNDY/FR.-C.	26.9	62	12.1	32	343	23.8	83	181	17.0	1.34	57.7	55.9	4.0	58.7	1 701	275
CENTRE NORTH	38.4	59	12.0	32	393	23.7	70	177	16.7	1.36	60.4	53.6	3.0	57.7	1 694	276
CENTRE SOUTH	26.4	62	11.5	29	389	22.2	76	153	17.0	1.21	53.0	55.1	3.0	58.7	1 705	264
GREATER PARIS	18.5	56	12.0	30	371	21.8	93	161	16.2	1.40	58.4	54.3	1.5	58.7	1 589	269
NORD-PAS DE CALAIS	35.0	61	10.6	27	355	20.9	89	152	17.4	1.08	54.5	53.7	1.5	58.1	1 563	262
PAYS DE LA LOIRE	29.5	66	11.0	28	357	20.0	89	150	15.3	1.66	53.9	54.4	1.5	57.9	1 583	268
PICARDY	37.8	61	11.4	30	384	20.9	95	169	18.2	0.99	57.3	52.8	1.5	58.1	1 655	271
POITOU-CHARENTES	28.2	82	11.5	30	389	21.4	87	173	16.4	1.54	52.7	56.0	5.0	59.4	1 600	267
ROSARIO																
CHAMPAGNE-A.	28.1	44	10.7	36	252	22.5	78	168	23.2	0.48	51.9	54.3	1.5	56.9	1 734	254
PICARDY	26.3	59	11.3	35	318	24.5	69	176	22.5	0.56	51.5	54.5	3.5	56.7	1 636	273
ROYSSAC																
CENTRE SOUTH	17.0	51	11.3	33	370	24.6	53	147	20.5	0.67	46.7	55.6	2.5	57.4	1 599	222
SANKARA																
BRITTANY	21.9	48	10.9	36	408	21.0	86	161	24.4	0.38	53.4	50.4	2.0	57.1	1 651	244
CHAMPAGNE-A.	25.2	57	12.1	38	361	26.5	56	155	24.1	0.41	48.9	53.7	4.0	56.9	1 630	201
LORRAINE	51.0	58	11.6	40	379	24.4	62	166	25.4	0.35	51.4	52.4	1.5	56.7	1 721	251
NORMANDY	30.1	62	10.8	34	390	21.2	83	142	23.0	0.41	51.4	50.8	1.5	56.1	1 643	253
PICARDY	51.7	62	11.3	36	406	23.9	66	180	24.2	0.45	51.7	52.4	1.5	57.0	1 709	275
SOISSONS*																
AUVERGNE	14.9	62	12.6	37	379	24.8	95	270	22.8	0.69	63.3	55.5	9.0	58.9	1 654	255
MIDI-PYRÉNÉES	13.7	64	12.3	33	359	25.0	88	231	24.0	0.49	63.1	53.9	9.0	56.7	1 578	242
TOISONDOR																
NORMANDY	22.6	51	10.1	28	326	17.6	99	81	13.5	1.38	•	49.3	1.5	56.0	1 536	271

* Analyses not conducted

* Varieties quoted on the "Varieties Recommended by the Miller" (VRM) list drawn up by the National Association of French Millers (ANMF). This list and that of the French Milling Industry breadmaking Wheats (BPMF) are available from the ANMF. The protein content and Hagberg falling index, measured by the ARVALIS Analysis Centres, are covered by Cofrac accreditation no. 1-0741.

Sources: FranceAgriMer / ARVALIS - Institut du végétal





Very good baking quality

• Due to the lower protein content, the baking strength (w) is slightly lower than in 2008. It remains however at a good level in terms of the national average. The results of breadmaking tests are generally good and better than for last year. A certain degree of heterogeneity may also be noted for certain somewhat elastic varieties. On kneading, doughs have average hydration levels this year. They are fairly elastic on working, which favours varieties with a tendency to be tenacious. The breads have an attractive appearance, with good volumes and well-developed cut marks.

Focus on leading varieties

• Apache gets satisfactory overall total scores, but these are uneven from region to region. On kneading, the dough is not always very smooth and sometimes sticks. It is supple and elastic when worked. The breads may be fairly flat, but the cut marks are usually very clear. The volumes are average.

The breadmaking results for Caphorn, the second most cultivated variety in France, are excellent. The dough is perfectly hydrated and behaves well on kneading. It proves to be quite balanced on working even though it sometimes lacks elasticity. The bread results are very good, with a clear cut marks and well-risen volumes.

Premio, a rapidly-growing variety, also has very good results, in particular with good dough behaviour at all stages of the breadmaking test. The breads are well developed with satisfactory volumes.

The top three varieties – Apache, Caphorn and Premio, which are perfectly complementary this year - will constitute a basis for very good quality. The diversity of profiles and level of quality of French varieties will enable our different markets to be supplied with mixes with high technological value.

Animal feed

• Each year, cattle feed manufacturers incorporate 5 - 6 million tonnes of wheat in their formulas. To enable them to have a better appraisal of national supply, the definition of classes has been transposed by calculating the protein content using the multiplier coefficient (N x 6.25) usually used for animal feed. In addition, class 3 has been subdivided into three differentiated classes according to protein content. For 2009, the majority of class 3 wheats are class 3-2, the intermediate class in terms of protein content.

BREAKDOWN ACCORDING TO THE CLASSIFICATION TABLE FOR ANIMAL FEED

Classes	Proteins	Baking strength (w)	Hagberg	Breakdown	
	N x 5.7				N x 6.25
€	≥ 12%	≥ 13.2%	≥ 250	≥ 220	2%
1	11 - 12.5%	12.1 - 13.7%	160 - 250	≥ 220	50%
2	10.5 - 11.5%	11.5 - 12.6%	according to contract specifications	≥ 180	38%
3-1	≥ 10.5%	≥ 11.5%	not specified	not specified	1%
3-2	9.6 - 10.5%	10.5 - 11.5%	not specified	not specified	8%
3-3	< 9.6%	< 10.5%	not specified	not specified	1%



A two-fold survey

Two distinct complementary surveys were conducted by FranceAgriMer and ARVALIS, Institut du végétal, with the support of Intercéreales, the National Association of the French Milling Industry (Association Nationale de la Meunerie Française - ANMF) and the National Multi-Profession Group for Seeds and Plants (Groupement National Interprofessionnel des Semences - GNIS).

• Varietal survey in the field

A postal survey conducted by FranceAgriMer with 35,000 farmers, selected at random from 67 départements in May to July 2009, was used to establish the breakdown of varieties by department and region. On the basis of this information, a draw was used to select a representative group of farmers from whose crops some 1300 samples of pure varieties were taken at harvest time by the regional FranceAgriMer delegations. Regional varietal mixes were then formed by the ARVALIS Analysis Centres using at least 4 elementary samples for which the varietal identity was monitored by PCR (Pr NF [French standard] V03-045). The varietal mixes were then analysed by the ARVALIS Analysis Centres and Chopin Technologies laboratory.

• Collection point survey

The network for the collection point survey comprises 200 silos belonging to cooperatives and traders. During harvest time, some 600 samples were taken from the silo entrances by FranceAgriMer staff and shipped to the company laboratory for analysis.

These samples represent the categories established by each of the approved collection points.

Analytical methods

• Protein content

This measurement was taken on whole grains using near infrared spectroscopy. For human food, the protein content was calculated using a coefficient of 5.7 and refers to dry matter (DM). The coefficient used for animal feed is 6.25.

• Mass per hectolitre or specific weight (NF V 03-719)

This is calculated on the basis of the mass of a litre of grains and is expressed in kg/hl of the matter 'as is'.

• Hagberg-Perten Falling Number (NF EN ISO 3093)

This is an indirect measurement of the level of alpha-amylase activity, which may become excessive

due to the presence of grains which have germinated or are in the process of germination. The falling number is expressed in seconds. It corresponds to the length of time required for a stylet to reach the bottom of a tube containing a mixture of milled wheat and water immersed in a boiling water bath. A short time indicates high amylase activity and damaged quality.

• Water content (NF V 03-707)

This is equal to the loss of mass following steaming of the products at a temperature of 130-133 °C and is expressed as a %.

• Hardness index (AACC 3970.A)

Hardness, or the cohesion state of the grain, is measured by near infrared reflectance spectrometry using the calibration in force in the USA. The various categories of hardness (extra-soft, soft, medium-soft, medium-hard, hard and extra-hard) are expressed by an index on a continuous scale graduated from 0 to 100. It is generally accepted that index 25 corresponds to the average value for soft wheats and index 75 corresponds to hard wheats.

• Zeleny index (NF ISO 5529)

This gives an overall indication of protein quantity and quality by measuring the height of the deposit, in ml, obtained after agitation and sedimentation of a preparation of flour suspended in a reagent composed of lactic acid, isopropyl alcohol and a dyeing agent.

• Moist gluten content and gluten index (ICC 155)

These values are used to assess the following:

- the quantity of gluten extracted after mechanical kneading and washing of a mixture of ground wheat and salt water,
- the viscoelastic quality of the gluten by centrifugation through a sieve. The higher the index, the more tenacious the gluten.

• Measurement of the water absorption rate of flours and the rheological characteristics of the dough during kneading using Mixolab® (Pr NF V03-765)

The principle of the Mixolab consists of measuring the torque exerted by the dough between two

baffles turning in opposite directions. This measurement of the consistency of the dough makes it possible to evaluate the absorption strength of flours as well as their behaviour during kneading. Four main parameters are estimated: hydration, development time, stability and weakening. Hydration, or water absorption, expressed as a % of flour with 14% water content, indicates the amount of water to be added to a flour to make a dough of a given consistency (1.1 Nm). The development time, expressed in minutes, provides information about how long it takes to transform the flour into dough from the outset to its optimal development stage. Stability, expressed in minutes, gives the time during which the consistency developed does not change. Weakening, expressed in Nm, measured at the end of the development stage, indicates the loss of consistency of the dough after a given period of kneading.

• The Chopin alveograph test (NF EN ISO 27971)

The alveograph test is performed on flour from a test mill. Measurement takes place by recording the rheological behaviour of a disk of dough subjected to deformation in the form of a bubble. Four main parameters are assessed: W, G, P and P/L. W is the work of deformation of this dough which gives a good indication of baking strength. G, or the rising index, expresses the elasticity of the dough. P refers to the tenacity of the dough. The P/L ratio indicates the balance between tenacity and elasticity. Finally, the "ie" parameter expresses the elasticity of the dough.

• French breadmaking test (NF V03-716)

The breadmaking test is performed using flour from a test mill. Water, yeast, salt, ascorbic acid (20mg/kg) and sometimes malt are added to the flour. The quantity of water added to the flour is determined by the baker according to the consistency of the dough and is expressed in relation to flour with 15% water content. Breadmaking quality is assessed at each stage of the breadmaking process resulting in a final score out of 300. This sums up 30 interim scores awarded by the baker throughout the entire breadmaking process, from kneading through to observation of the baked bread and dough and measurement of the volume. A breadmaking score below 200 means that the wheat is not very suitable for French breadmaking, while on the other hand a score above 250 indicates good breadmaking quality wheat

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