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MARS AGROMETEOROLOGICAL Bulletin

Monitoring Agriculture with Remote Sensing

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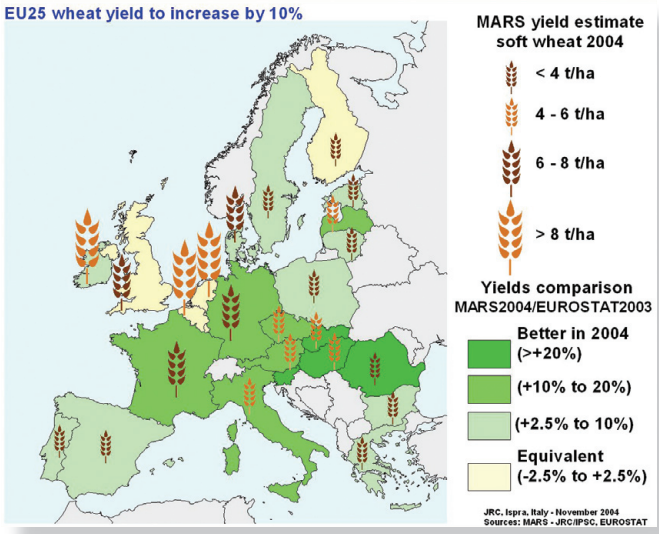
'A record year for cereal production'



MARS STAT yield forecasts at European level: 30 October 2004

Crops	EU-15 yield (t/ha)					EU-25 yield (t/ha)				
	2003	2004	% 04/03	Avg. 5 years	% 04/Avg.	2003	2004	% 04/03	Avg. 5 years	% 04/Avg.
Cereals (total)	5.1	**5.9**	*14.8*	5.5	7.2	4.6	**5.2**	*13.7*	4.8	7.8
Soft wheat	6.1	**7.2**	*16.8*	6.5	10.0	5.4	**6.2**	*13.5*	5.7	7.8
Durum wheat	2.3	**2.7**	*15.0*	2.4	11.1	2.3	**2.7**	*15.0*	2.4	10.9
Barley	4.4	**4.8**	*8.0*	4.6	4.9	4.1	**4.5**	*9.8*	4.2	7.5
Grain maize	7.6	**8.9**	*17.2*	8.8	1.6	7.0	**8.2**	*16.4*	7.6	8.1
Other cereals (1)	3.8	**4.2**	*12.5*	4.1	3.0	3.0	**3.4**	*12.2*	3.2	6.2

Contents

(1) Sorghum, rye, maslin, oats, triticale, mixed grain other than maslin, millet, buckwheat.

Sources for yield: 2003 yields come from Eurostat Cronos.
2004 yields come from MARS crop yield forecasting system.

Highlights

Normal/mild conditions in winter with low frost impact and favourable-to-optimal maturity/pre-harvest and harvest weather conditions determined record values in cereal expectations.

The final expected yields for all the cereal crop classes are not only recovering from the depths reached in 2003 but contributing to determine the highest production result on the years for which reference is available (1992–2003) at EU-25 level. Total cereal production (excluding rice) is expected to reach more than 274 million tons (+ 16.1 % compared with 2003 and + 8.1 % compared with the average), where the contribution of the yield is 5.2 t/ha instead of 4.6 t/ha in 2003 (+ 13.7 %) or 4.8 t/ha as average (+ 7.8 %).

These figures, do not take into account possible farming/technological improvement in the new EU-25 Member States (for instance an increase in the use of fertilisers) not covered by our simulation/measures which could further increase the result.

A. Synthesis of the 2003/04 campaign

EU-25 crop yield forecasts: 30 October 2004

Crops	Soft wheat			Durum wheat			Barley			Oilseed rape		
Yield (t/ha)	2003	2004	% 04/03	2003	2004	% 04/03	2003	2004	% 04/03	2003	2004	% 04/03
EU-25	5.4	6.2	13.5	2.3	2.7	15.7	4.1	4.5	9.8	2.7	3.0	8.6
EU-15*	6.1	7.2	16.8	2.3	2.7	15.7	4.4	4.8	8.0	3.0	3.2	7.9
AT*	4.4	5.0	12.5	3.8	3.4	-10.9	4.2	4.7	12.4	1.8	2.4	34.8
BE*	8.5	8.5	0.1	-	-	-	6.6	7.4	11.5	-	-	-
CY	-	-	-	-	-	-	2.5	2.3	-7.2	-	-	-
CZ	4.1	4.8	17.6	-	-	-	3.8	3.8	-0.3	1.5	2.4	55.8
DE*	6.5	7.8	19.2	-	-	-	5.1	6.4	24.7	2.9	3.3	15.8
DK*	7.1	7.3	3.0	-	-	-	5.3	5.4	1.0	3.3	3.2	-4.0
EE	2.2	2.2	3.1	-	-	-	1.9	2.0	5.9	1.5	1.7	10.6
ES*	3.1	3.3	6.5	2.5	2.4	-3.7	2.8	3.1	10.1	-	-	-
FI*	3.5	3.5	-1.5	-	-	-	3.2	3.3	1.9	1.3	1.2	-1.9
FR*	6.4	7.6	18.2	4.0	4.6	13.2	5.6	6.6	17.0	3.1	3.3	4.4
GR*	2.6	2.7	5.3	1.8	2.3	25.0	1.9	2.2	17.2	-	-	-
HU	3.7	4.5	21.8	-	-	-	3.3	3.6	9.4	4.2	1.9	-56.1
IE*	8.3	8.9	7.3	-	-	-	6.5	6.7	2.4	-	-	-
IT*	4.4	5.1	16.2	2.2	2.7	22.7	3.3	3.5	6.2	-	-	-
LT	3.6	3.8	5.9	-	-	-	2.9	2.9	-1.0	1.8	1.7	-5.9
LU*	6.1	6.0	-2.2	-	-	-	5.3	5.5	2.1	-	-	-
LV	2.8	3.1	11.1	-	-	-	1.9	2.0	6.8	1.4	1.7	19.9
MT	-	-	-	-	-	-	-	-	-	-	-	-
NL*	8.7	8.7	-0.4	-	-	-	6.4	6.2	-2.9	-	-	-
PL	3.4	3.6	6.8	-	-	-	2.8	3.2	13.4	1.9	2.5	36.6
PT*	1.2	1.3	9.8	0.9	1.2	33.1	1.2	1.3	8.0	-	-	-
SE*	5.6	5.9	6.1	-	-	-	4.2	4.2	-0.2	2.2	2.5	13.1
SI	3.5	4.3	25.5	-	-	-	2.9	3.5	20.4	-	-	-
SK	3.0	4.5	48.6	-	-	-	3.0	3.6	20.5	1.0	2.1	102.0
UK*	7.7	7.8	1.8	-	-	-	5.9	5.7	-3.7	3.3	3.3	1.1

Crops	Grain maize			Sunflower			Sugar beet			Potato		
Yield (t/ha)	2003	2004	% 04/03	2003	2004	% 04/03	2003	2004	% 04/03	2003	2004	% 04/03
EU-25	7.0	8.2	16.4	1.6	1.8	11.3	53.9	57.1	5.8	26.6	29.4	10.3
EU-15*	7.6	8.9	17.2	1.5	1.7	8.9	57.5	61.2	6.4	34.3	37.4	9.1
AT*	8.4	9.6	14.3	2.8	2.5	-9.7	57.5	68.9	19.8	26.5	30.5	14.9
BE*	10.5	11.6	10.3				70.7	71.5	1.1	42.5	45.9	7.9
CY	-	-	-	-	-	-	-	-	-	-	-	-
CZ	5.6	7.1	28.1	2.4	2.4	0.0	45.2	49.2	8.9	19.0	22.0	16.1
DE*	7.4	9.3	25.4	2.0	2.4	21.8	53.2	60.0	12.7	34.5	41.6	20.6
DK*	-	-	-	-	-	-	57.6	60.1	4.3	39.2	40.8	4.1
EE	-	-	-	-	-	-	-	-	-	14.4	13.9	-3.5
ES*	9.1	10.1	10.9	1.0	1.1	16.6	64.7	71.8	11.0	26.9	27.0	0.3
FI*	-	-	-	-	-	-	31.0	32.7	5.4	21.5	24.4	13.5
FR*	7.1	8.9	25.5	2.2	2.3	7.6	73.3	74.4	1.5	40.4	41.0	1.7
GR*	8.8	8.4	-4.6	1.3	1.3	3.3	56.4	62.4	10.6	23.9	23.5	-1.6
HU	5.9	6.7	12.6	1.8	2.0	12.5	39.5	43.3	9.8	23.5	22.8	-2.9
IE*	-	-	-	-	-	-	47.8	50.2	5.1	34.5	35.0	1.4
IT*	7.5	8.4	12.9	1.6	1.7	6.3	33.3	39.1	17.4	21.8	23.9	9.6
LT	-	-	-	-	-	-	37.9	36.1	-4.6	15.5	15.6	0.8
LU*	-	-	-	-	-	-	-	-	-	-	-	-
LV	-	-	-	-	-	-	37.0	38.3	3.6	13.5	13.8	2.0
MT	-	-	-	-	-	-	-	-	-	-	-	-
NL*	11.7	12.0	2.9	-	-	-	60.7	59.7	-1.8	40.8	44.5	9.1
PL	5.3	6.1	16.0	-	-	-	41.0	41.8	2.0	17.9	19.5	8.9
PT*	5.6	6.3	10.9	0.6	0.6	2.0	64.6	64.9	0.4	15.2	14.3	-5.8
SE*	-	-	-	-	-	-	49.6	50.3	1.3	28.1	27.5	-2.0
SI	5.1	6.3	23.5	-	-	-	-	-	-	-	-	-
SK	4.1	5.2	26.2	1.9	1.8	-5.9	36.6	40.8	11.3	15.3	16.2	6.0
UK*	-	-	-	-	-	-	57.3	60.0	4.6	40.7	42.8	4.9

Note:
(a) Countries with areas below 10 000 ha are not counted in.
(b) Yield figures are rounded to 100 kg.
(c) The national yield forecasts are based on agro-meteorological model outputs and satellite indicators at NUTS 0 level in combination with time trend analysis.

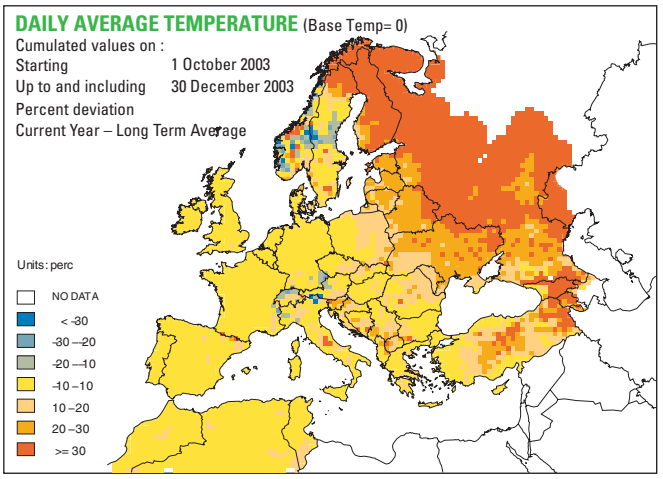
Sources:
2003 yields come from Eurostat Cronos.
2004 yields come from MARS crop yield forecasting system.

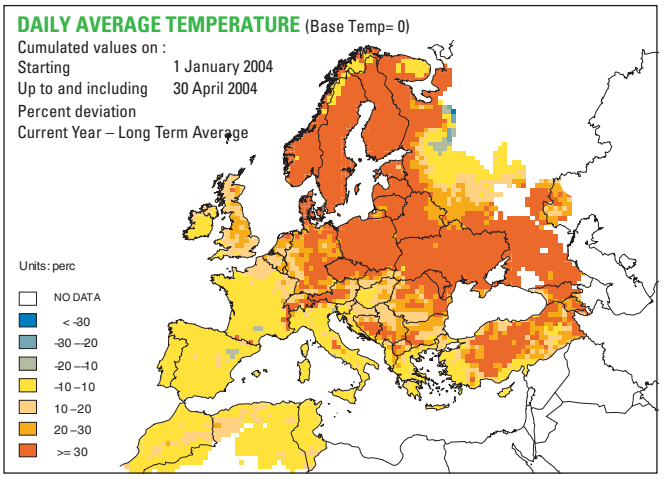
Climatic overview for the 2003/04 campaign

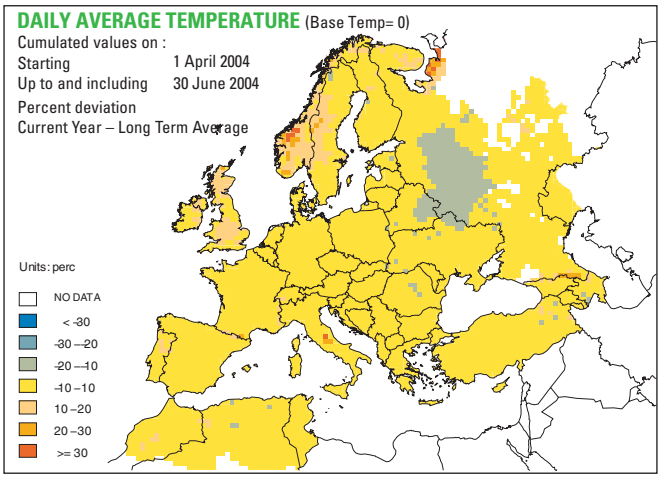
Autumn 2003 (October to December): a colder than average October was followed by a warmer period; generally normal rainfall; relatively dry in central EU countries, the UK, Ireland and Greece; above average water supply in the Mediterranean area, the Balkans, Maghreb and Turkey

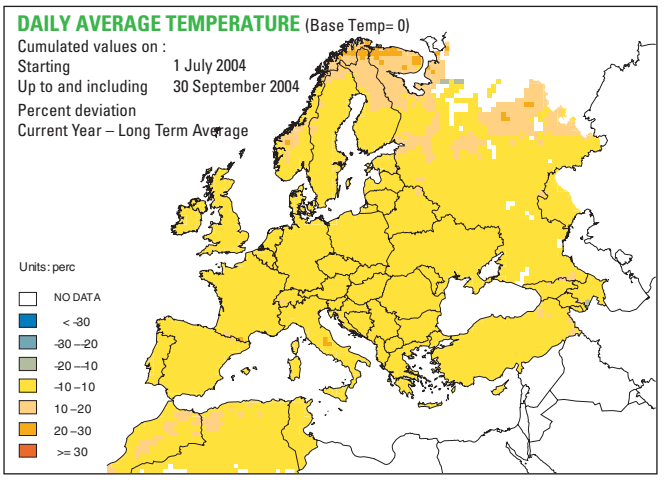
Summer conditions continued until the end of October, when a cold front invaded the whole northern part of the continent, and France, Germany, northern Italy, Poland, the Czech Republic, Slovakia, Austria, Hungary and Romania experienced a few days with temperatures below 0 °C: in general, the minimum temperatures reached – 3/– 4 °C, but locally (e.g. in Germany and Poland) temperatures of – 7/– 8 °C were also recorded. In November, the air flux changed drastically and normal temperatures returned to the western EU countries, with warmer than average temperatures in the central and eastern EU countries and Russia, Ukraine and the candidate countries. Similar, but closer to the long-term average, thermal conditions were present in December.

Generally speaking, during the season, the rainfall was distributed over the various countries at different times. In October, the rainfall was more widespread and affected the whole continent, with the exception of England, Ireland and the extreme north of France, Denmark and Sweden. In November, rain fell mainly over the Balkans and Danubian countries, Turkey, northern Poland and Baltic areas. In December, a good supply of rain fell only on Maghreb, southern Italy and France, Turkey, Poland, Scandinavia and the Baltic area. In general, while low rainfall occurred in the central part of the EU, central northern Italy and Greece (in particular in northern France, Belgium, southern England and Denmark), the southern regions presented cumulated values above average (central Spain, southern Italy, Sicily, the Balkans and southern Romania). Local intense showers were recorded in a few areas (southern France and southern Italy). The conditions were generally favourable for winter crop sowings.









Publication issue

The sixth printed ***MARS Bulletin*** reviews:
— the 2003/04 agricultural campaign;
— the start of the new 2004/05 campaign from 1 September to 10 November 2004.

It makes a synthesis of the major issues pertaining to:
— agro-meteorological conditions of the 2003/04 campaign;
— conditions at sowing for the new winter crops.

Previous related analyses available:

— Conditions at sowing — beginning of November 2003	**(Vol. 11, No 6)**
— November and December 2003 climatic update	
— Winter crops conditions in January and February 2004	**(Vol. 12, No 1)**
— Winter crops and spring sowings in March and April 2004	**(Vol. 12, No 2)**
— Winter and spring crops in May 2004	**(Vol. 12, No 3)**
— Winter and spring crops between 1 June and 10 July 2004	**(Vol. 12, No 4)**
— End of August 2004 analysis	**(Vol. 12, No 5)**

Contributions

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MARS agro-meteorological web database is accessible at:
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MARS stands for Monitoring Agriculture with Remote Sensing

Technical note

The long-term average used within this bulletin as a reference is based on an archive of data covering 1975–2003.
The CNDVI is an unmixed normalised vegetation index on the base of Corine land cover mainly for arable land or grassland.

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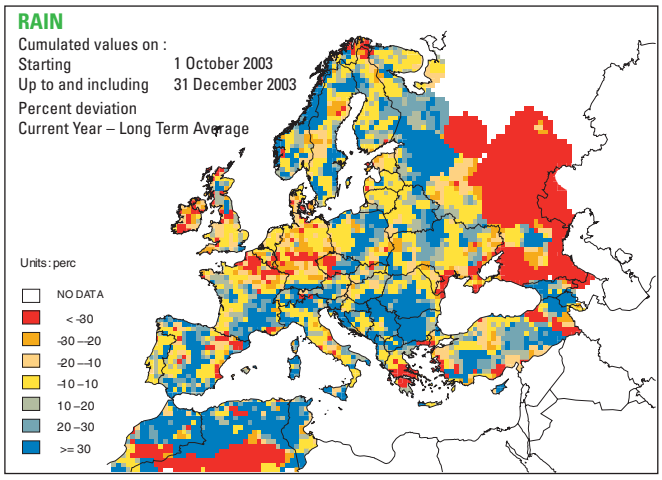
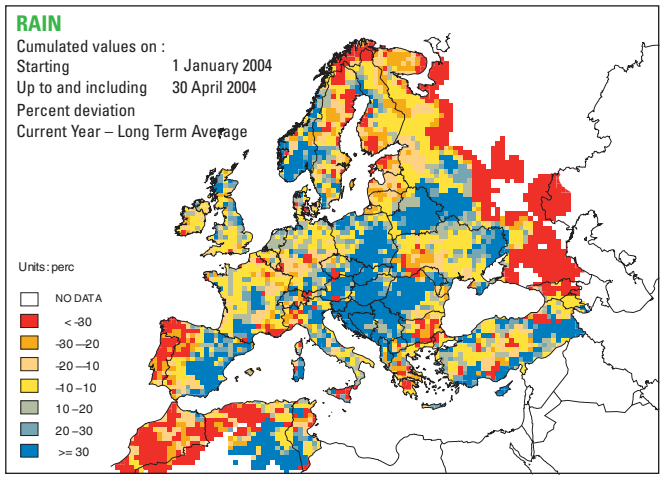
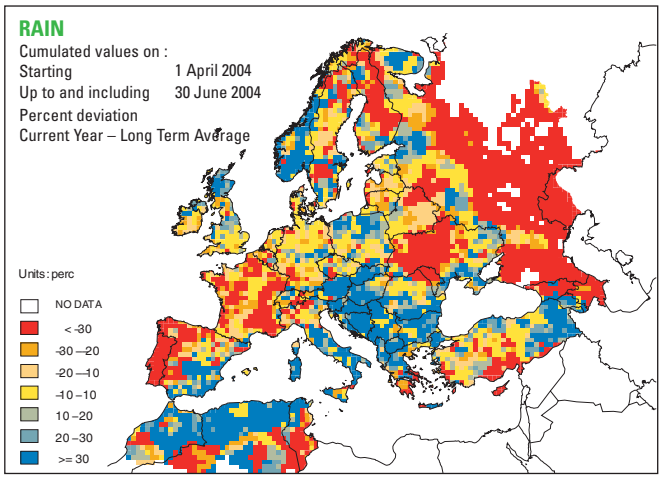
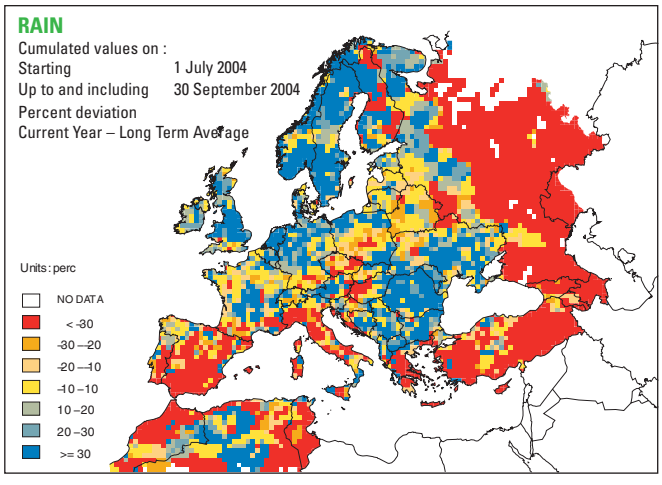








Winter 2004 (January to March): generally higher seasonal temperatures; low risk of frost damage due to extended and sufficient snow cover; relatively dry in northern Spain and Portugal, Maghreb, north-western Italy; wet in eastern and central countries, the Balkans and southern Spain

As a synthesis, the season was characterised by warmer than average conditions in the central and eastern European areas, a general low risk of frost damage on winter cereals (except small scattered areas in the Czech Republic, Poland, Ukraine, Belarus, Russia and Turkey), while temperatures closer to the average and relatively dry conditions were recorded in Maghreb, on the Iberian Peninsula and in costal areas of France, Italy and Greece. Overall, the cumulated 'active temperatures' (with base temperature of 0 °C) were higher than average east of the line connecting Great Britain and Greece, whilst in the remaining areas the values were very close to that of the long term. The active temperatures compared with the same period last year appeared cooler, resulting in a more normal crop development rate.

During the season, the warmer conditions were interrupted by several cold waves: in January, during the first dekad, a cold wave crossed Greece, western Turkey, Hungary, southern Italy and France (in many areas in Germany, France and central eastern countries, the minimum temperatures reached – 10/– 15 °C, combined with consistent snowfalls); in the last part of the month a second cold wave invaded the continent from Denmark to Greece (with more severe minimum values and abundant snow). In some western areas of the Czech Republic, western Poland, Ukraine and parts of Belarus, Russia and Turkey, where the snow cover was insufficient, there were low-to-moderate levels of frost risk. In the second dekad of February, a new very cold wave crossed southern Italy, the Balkans, Turkey and Greece, where exceptional negative peaks (8–10 °C below the expected values and maximum daily values also below 0 °C) were recorded.

The cumulated rains of the season and their comparison with the long-term average show significantly higher values over the central and eastern countries and in southern Spain, north-eastern Italy and northern Germany. In general, these rains were well distributed, except in the central and eastern countries, where several consecutive rainy days were recorded. In contrast as a whole, Greece, northern and western Spain (Castilla y Leon, Aragon, Cataluña, Comunidad Valenciana), southern and north-western Italy (Sicily, Puglia, Sardinia, Piemonte), Maghreb and southern Russia received a reduced amount of rain and consequently experienced a reduction of soil moisture.

Persistent rains, although not very intense, caused possible local and temporary excessive moisture conditions in some areas of the Netherlands, Ireland, south-western England, Scotland, north-western Germany, France (except the southern part), northern Poland, Belarus and Balkan countries.

Spring 2004 (April to June): generally seasonal thermal conditions; very scarce rain supply in France, Portugal and eastern countries; in contrast, very abundant rain in the Mediterranean Basin (except southern Greece) and the Balkans

In the early part of the period, during April and even more so in May, the delayed arrival of the Azoreans' anticyclone within the Mediterranean Basin caused unstable weather conditions in the Basin, linked to rainy periods.

In the northern countries, during the same period, the barometric configuration determined unseasonable milder temperatures (estimable at around 1 °C at a daily level) that increased the accumulated high solar radiation and relatively low cumulated rains from the previous months.

At the end of May, a thermal surplus was present in Scandinavia and Great Britain but, in contrast, a relative deficit was recorded in Belarus and northern Ukraine, where the negative differences of the cumulated active temperature (base temperature 0 °C) exceeded 50–60 °C. In these areas, the thermal deficits which occurred in May almost cancelled the surpluses accumulated from the beginning of the year, slowing the development rate of crops.

The synoptic configuration described so far pushed the Atlantic rainy fronts towards the southern latitude of the European continent. The Mediterranean countries and the Balkans received very large amounts of rainfall compared with the average (in many cases above 70 %). In contrast, the more Atlantic-exposed areas (in particular, Portugal, northern Spain, France, Benelux, Ireland and Denmark), as well as eastern countries (Ukraine), received lower than expected accumulated rain values (estimable at around 50 %). In some

areas (southern Spain, north-western Italy and southern Ukraine) localised extremely intense showers (more than 70 mm) were recorded.

Finally, in June, the Azoreans' anticyclone affected the western part of the continent, producing higher than average temperatures, especially in western Ireland, western England, south-western France and the Iberian Peninsula (where maximum temperatures above 40 °C occurred in the south-west of the peninsula during the latter part of June).

As a whole, compared with the extreme situation recorded the previous year in the same period, temperatures were positively cooler (but still slightly milder than normal) and wetter; favourable both for the Mediterranean countries, which received sufficient water supplies for the last part of the winter crops, and also for continental and northern areas, which received more solar radiation and correct active temperatures.

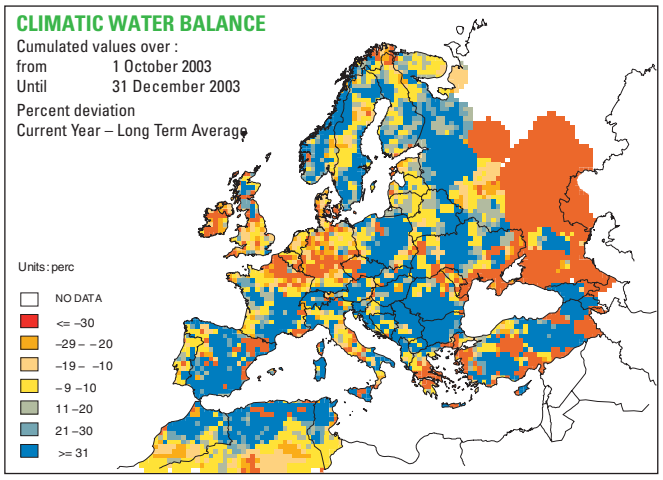
Summer 2004 (July to September): still seasonal thermal condition; drier than expected in the Mediterranean Basin (especially in northern and central Italy, the Czech Republic and north-western Hungary); in August, excessive rains in Great Britain, Sweden, the Netherlands and Romania; generally normal water supplies in the other areas

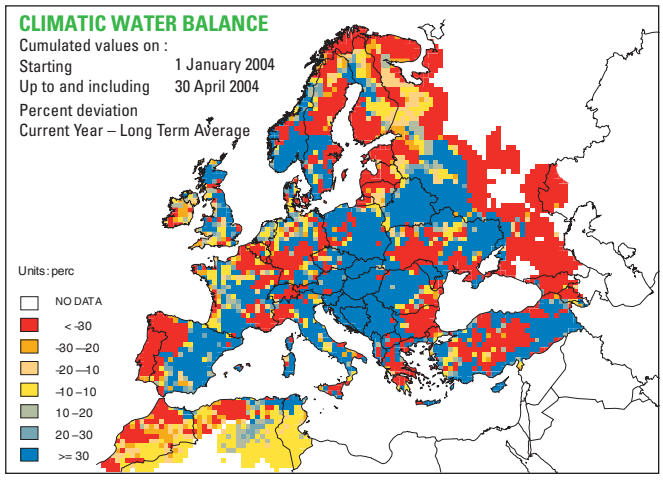
During this season, the accumulations of active temperatures were within the normal ranges of variation. The only exceptions were eastern Belarus, northern Latvia, Sweden and Denmark, where both August and September were slightly hotter than usual. Anyway, in August, all the southern half of Europe experienced temperatures above 30 °C. In some areas, namely the southern Iberian Peninsula, south-western France (Armagnac), Greece, western Turkey, south-eastern Italy, southern Romania and northern Bulgaria, temperatures even reached 36 °C. In some cases, heat stress at maize flowering or during the ripening of winter crops was a possibility. Nevertheless, the hot peaks and high temperatures were within the norm for the summer season and the temperatures were cooler than in the previous year, resulting in a more correct winter and spring cereal maturity.

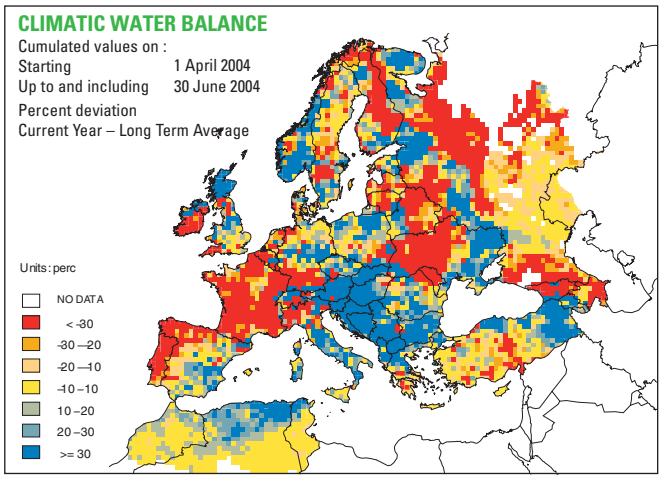
Therefore, in this season, the most relevant phenomenon was the abnormal rain distribution. In effect, July and, even more so, August were, in general, particularly wet in the majority of the European territories. In contrast, September brought little rain over the continent, except in the extreme northern areas (namely Sweden, Norway and Ireland). The cumulated precipitation for July–August exceeded the long-term average (on average + 30 %) in the UK, northern Portugal, most of France, northern Germany, Denmark, the Scandinavian peninsula, northern Poland, central Belarus, Ukraine, Romania, Bulgaria, the western Balkans and limited areas of central Turkey. Mediterranean areas (especially southern Spain) received less rain than normal (in many cases more than 30 % less) and a similar situation was noticed for the central part of Europe (eastern Czech Republic, eastern Austria and western Hungary).

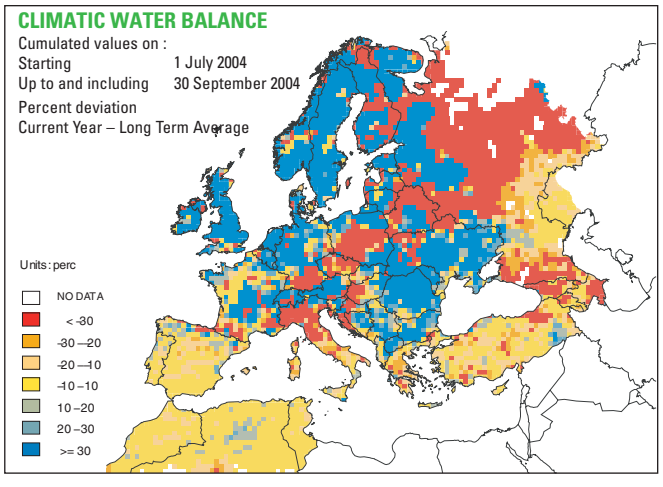
In August, the abundant and persistent rains affected all the North Sea areas of the EU, determining short 'windows' favourable for winter cereal harvesting and determining good water support for maize and sugar beet. As regards winter cereal, the most affected areas in terms of excessive rain at harvest appeared to be northern England and Scotland for spring barley and, for the more late-harvested varieties of the same crop, northern France, Benelux, the Nordic countries and north-western Germany.

In September, practically all over Europe (except Germany, Ireland, Romania, Bulgaria and northern Greece), the rains were significantly lower than expected. A few and localised extremely rainy occurrences (above 100 mmd^{-1}) were recorded in southern France and central Italy.







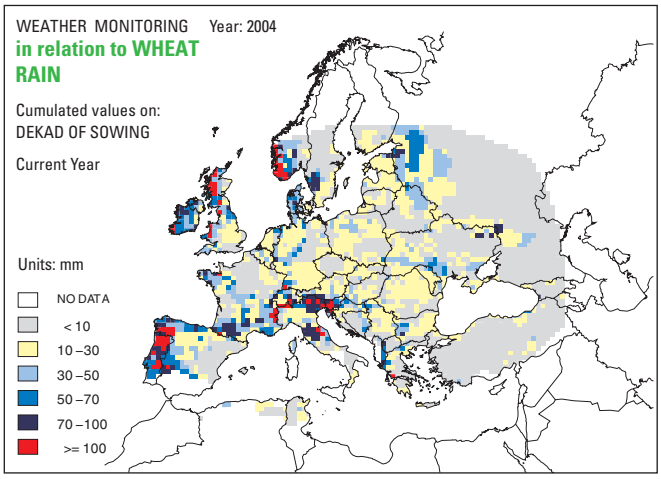


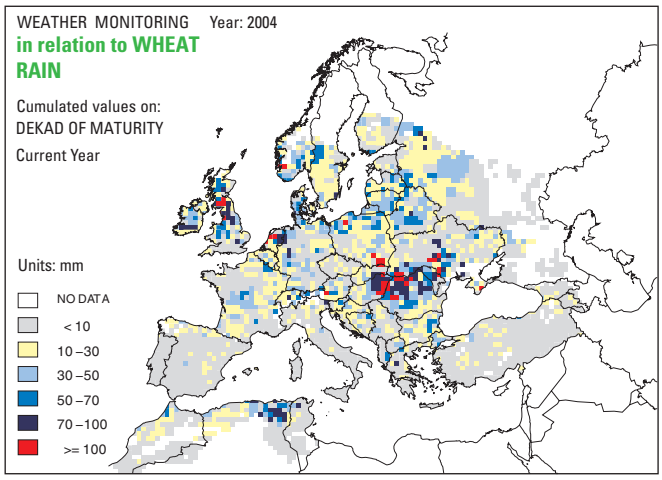
Agro-meteorological analysis on EU-25 area for 2003/04

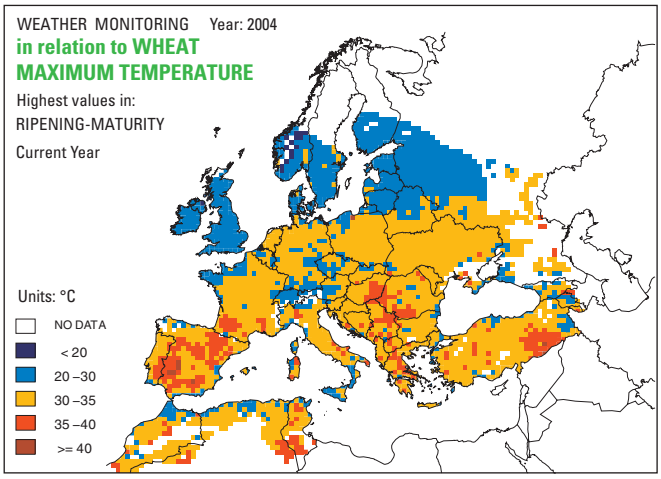
Cereals

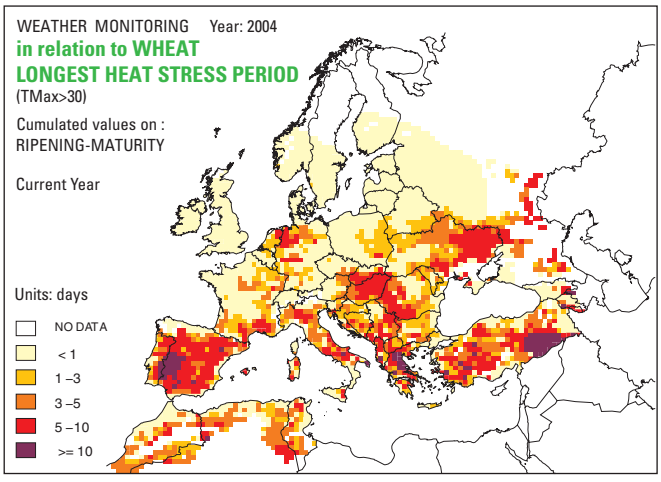
Favourable to optimal maturity/pre-harvest and harvest weather conditions determined record values in cereal expectations.

Total cereal production for the EU-25 (rice excluded) is now expected at 274.4 million tons (+ 38 million tons compared with 2003; + 16 % higher than 2003 production and 8 % higher than the possible average). While the area









increase is expected to contribute to the record production by + 2.1 %, the yield is expected to give the main contribution with 5.2 t/ha (+ 13.7 % compared with 2003 and + 7.8 % compared with the possible average).

These figures, which are based on simulation models and remote sensing observations, could represent an underestimation of the potential production which can be obtained in the light of possible farming/technological improvement in the new EU-25 Member States (for instance an increase in the use of fertilisers) which cannot be covered by our simulation/measures and are modelled by the current trends.

• Soft wheat

The yield is expected at 6.2 t/ha (+ 13.5 % compared with 2003 and + 7.8 % compared with the average).

Compared with the previous campaign, the increase of soft wheat production at the level of the EU-25 is expected to be about 19.5 % (for EU-15 this increase is expected at 22.1 %).

Very good yields are expected for Latvia (3.1 t/ha, 11.1 %), Austria (5 t/ha, 12.5 %), Italy (5.1 t/ha, 16.2 %), the Czech Republic (4.8 t/ha, 17.6 %), France (7.6 t/ha, 18.2 %), Germany (7.8 t/ha, 19.2 %), Hungary (4.5 t/ha, 21.8 %), Slovenia (4.3 t/ha, 25.5 %) and Slovakia (4.5 t/ha, 48.6 %).

The yields from Belgium (8.5 t/ha, 0.1 %), England (7.8 t/ha, 1.8 %) and Denmark (7.3 t/ha, 3 %) are expected to be close to the level of the previous year. In spite of partially unfavourable weather conditions, increased yields were estimated for Greece (2.7 t/ha, 5.3 %), Lithuania (3.8 t/ha, 5.9 %), Sweden (5.9 t/ha, 6.1 %), Spain (3.3 t/ha, 6.5 %), Poland (3.6 t/ha, 6.8 %), Ireland (8.9 t/ha, 7.3 %) and Portugal (1.3 t/ha, 9.7 %). For some countries, like Estonia (2.0 t/ha, – 9.2 %), the Netherlands (8.2 t/ha, – 6.2 %) and Finland (3.5 t/ha, – 1.5 %), the estimated yields for soft wheat are below the levels of the previous year, which were, however, above the average.

The weather conditions for the sowing of winter crops last year were generally favourable, especially in the northern part of the EU. The most striking exceptions were Portugal, south-western France (Aquitaine) and the areas north-east of the Adriatic Sea, where strong rains occurred (>= 100 mm) during the main sowing period of winter wheat. Except for south-western England and southern Poland, the rains occurred after sowing and permitted quick germination and uniform emergence. In contrast to the previous year, no major persistent frost problems were pointed out for winter 2003/04 and basically no significant drought conditions occurred in summer (with the exception of limited areas in the Iberian Peninsula). A cool beginning to summer slowed the initial grain filling which, together with a good water support, determined optimal maturity. Rainy conditions at harvesting were limited to some areas in Benelux (especially the Netherlands), north-western Germany, Denmark and Austria.

• Barley

The average barley yield is estimated for the EU-25 at 4.5 t/ha, an increase of 9.8 % compared with 2003 and 7.5 % compared with the average. The level of yield may be considered stationary for Sweden (4.2 t/ha, – 0.2 %), Denmark (5.4 t/ha, 1.0 %), Finland (3.3 t/ha, 1.9 %). Moderate increases of the barley yield (when expressed as percentages from the yield of previous year) are expected for Estonia (2.0 t/ha, 5.9 %), Italy (3.5 t/ha, 6.2 %), Latvia (2.0 t/ha, 6.8 %), Portugal (1.3 t/ha, 8.0 %) and Hungary (3.6 t/ha, 9.4 %). Larger increases are expected for Spain (3.1 t/ha, 10.1 %), Belgium (7.4 t/ha, 11.5 %), Austria (4.7 t/ha, 12.4 %), Poland (3.2 t/ha, 13.4 %), France (6.6 t/ha, 17.0 %), Greece (2.2 t/ha, 17.2 %), Slovenia (3.5 t/ha, 20.4 %), Slovakia (3.6 t/ha, 20.4 %) and Germany (6.4 t/ha, 24.7 %). Lower yields are foreseen for the UK (5.7 t/ha, – 3.7 %), the Netherlands (6.3 t/ha, – 2.9 %) and Lithuania (2.9 t/ha, – 1.0 %) due to a possible impact of overly wet conditions at harvest.

• Grain maize

The final yield expectation at EU-25 level is 8.2 t/ha. This is an increase of 16.4 % compared with 2003. The result is even better if related to the EU-15, where the forecast of 8.9 t/ha corresponds to an increase of 17.2 % compared with the previous campaign, which is likely to have been one of the worst

vintages recorded. In the current campaign the general weather conditions did not present particularly limiting extreme phenomena: during the sowings the rainfalls were in general well distributed and excessive only in Germany and central Italy; during the vegetative stages the active temperatures over practically all of the EU were very close to the long-term average values and development was quite regular; the water supplies, where irregular, were always quantitatively adequate; during flowering, the rains were present all over but only in France and Benelux are they likely to have been excessive; at the same time, the heat stress risk was very limited because of the mediocre high temperatures recorded in that period (only a very few days and in limited areas was the threshold of 35 °C passed); also during the maturity and harvest stages the rainfalls were appropriate and only in some areas (namely Slovenia and Alsace) are they likely to have been slightly excessive.

All of the countries present quite large positive differences of yield compared with 2003 (except Greece, where last year's yield was not affected by the extreme reduction recorded in the other EU countries), in particular France + 25.5 % with a national average yield estimated at 8.9 t/ha; Italy + 12.9 %, at 8.4 t/ha (below average result); Germany + 25.4 %, at 9.3 t/ha; and Spain + 10.9 %, at 10.1 t/ha.

Oilseeds

• Rapeseed

The rapeseed yield at EU level is expected to be better than last year with 3 t/ha (+ 8.6 % compared with 2003). Like the other winter crops, rapeseed did not face extreme conditions and it experienced normal conditions of grain filling. Among the main producers, Poland reached the highest increase, compared with last year, with 36.6 %, (2.5 t/ha) then came Germany + 15.8 % (3.3 t/ha), France + 4.4 % (3.3 t/ha) and the United Kingdom + 1.1 % (3.3 t/ha).

• Sunflower

After the bad 2003 campaign, production reached close to normal yield at EU-25 level with an average of 1.8 t/ha, better than 2003 by + 11.3 t/ha.

Among the three biggest producers, Spain reached a yield of 1.1 t/ha (+ 16.6 %), Hungary 2 t/ha (+ 12.5 %) and France + 2.3 t/ha (+ 7.6 %).

Root and tuber crops

• Sugar beet

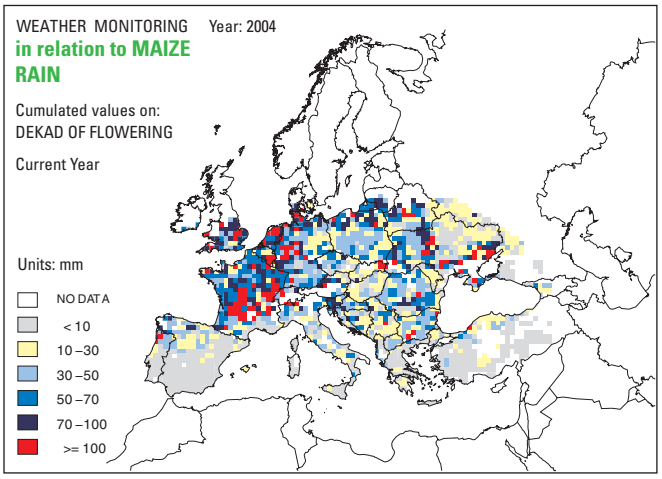
As well as the other crops, sugar beet experienced favourable conditions and, at EU-25 level, the yield increased to 57.1 t/ha (+ 5.8 % compared with 2003).

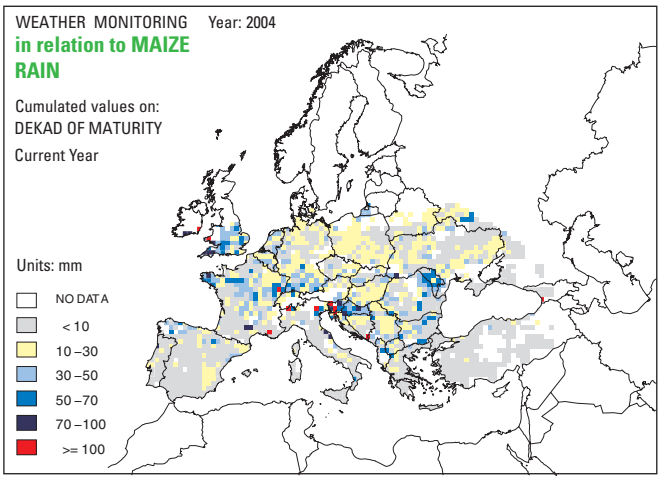
All the three biggest producer countries (France, Germany and Poland) present better yield forecasts than last year, particularly Germany with 60 t/ha (+ 12.7 % compared with 2003). France improved its yield level by + 1.5 % (74.4 t/ha). The forecast for Poland is better than 2003 with 41.8 t/ha (+ 2 %). Among the other main producers (United Kingdom, Italy, Belgium and the Netherlands), only the Netherlands reached a lower forecast of – 1.8 % with 59.7 t/ha. Italy, Spain, the United Kingdom and Belgium increased their forecasts respectively from + 17.4 % (39.1 t/ha), + 11 % (71.8 t/ha), + 4.6 % (60 t/ha) and + 1.1 % (71.5 t/ha).

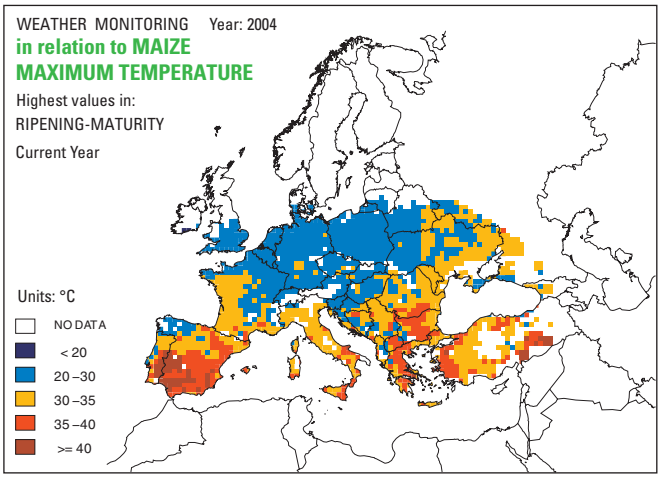
• Potato

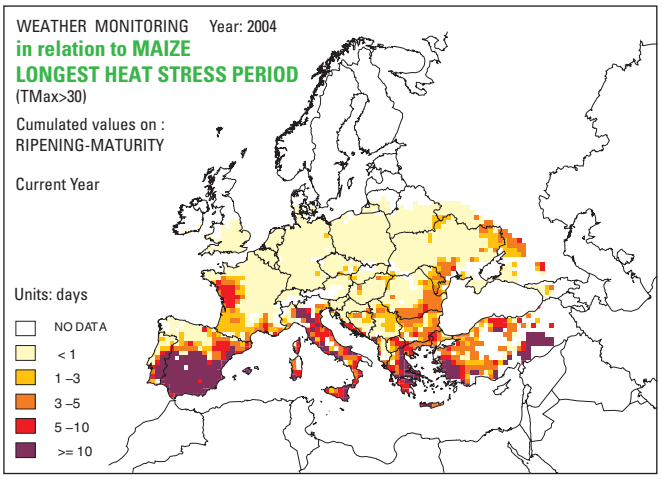
The same positive considerations and estimations are valid for the potato yield, which is expected at EU-25 level to be 29.4 t/ha (an increase of about 10.3 %).

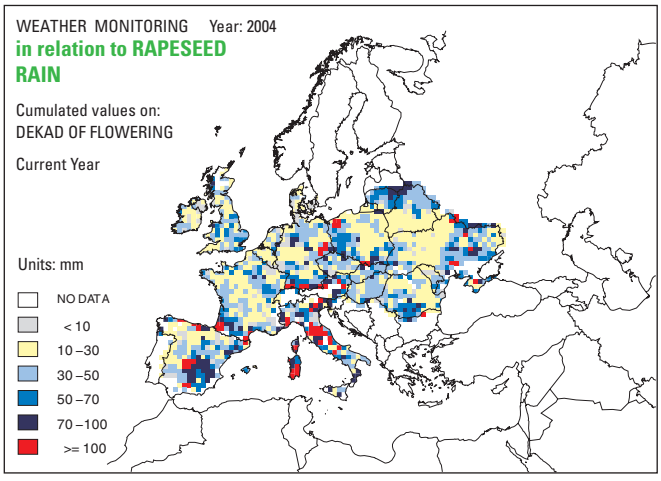
The most important producers, Poland and Germany, are forecast to reach yields of 19.5 t/ha (+ 8.9 %) and 41.6 t/ha (20.6 %). The other important producers present better forecasts than last year: + 9.1 % (44.5 t/ha) for the Netherlands, + 1.7 % (41 t/ha) for France and + 4.9 % (42.8 t/ha) for the United Kingdom.

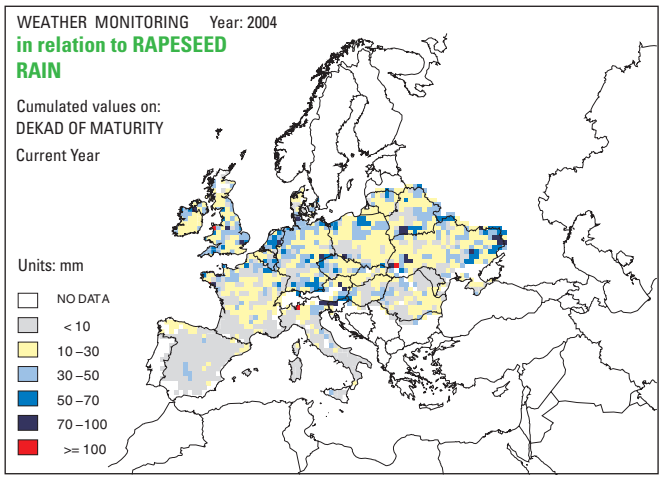


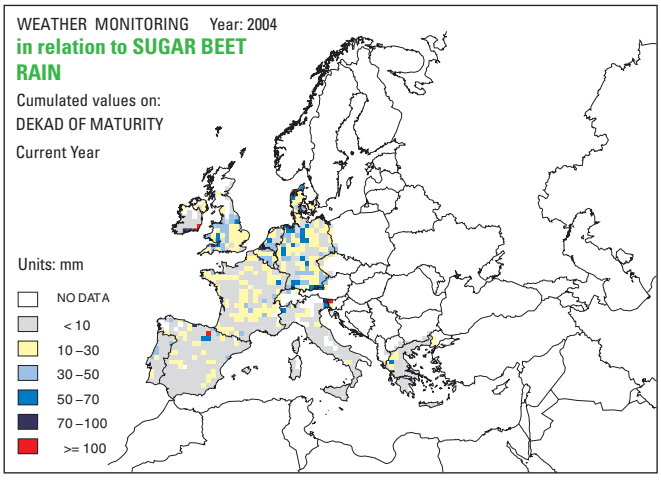


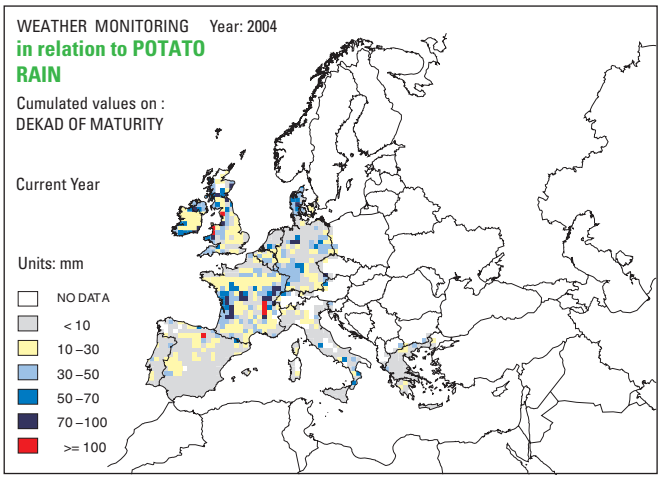












Agro-meteorological analysis on candidate countries for 2003/04

Bulgaria, Romania and Turkey

Bulgaria benefited from relatively favourable weather conditions for almost all the main crops. For winter wheat and barley, yield expectations are respectively 2.8 t/ha (+ 7.4 %) and 3.0 t/ha (+ 18.2 %). The summer crops, affected by droughty conditions in the previous year, are expected to provide higher yields this year: maize 3.7 t/ha (+ 41 %) and sunflower 1.1 t/ha (+ 31.4 %). For potato, a yield of 15.9 t/ha is estimated.

In Romania, in contrast with the previous agricultural campaign, which ended with very poor yields due to the extremely unfavourable conditions along the whole vegetation season, especially for winter crops, the situation this year is much better and higher than average: 2.9 t/ha (+ 99.9 %) for winter wheat, 2.2 t/ha for barley (+ 35.6 %) and 1.2 t/ha for rapeseed (+ 143.5 %). The maize yield is also expected to be higher than the previous year (3.2 t/ha, + 7.7 %). Yields expected for sunflower and potato are expected at 1.2 t/ha and 14.2 t/ha respectively.

In Turkey, the weather conditions from this campaign have led to a winter crop yield level similar to that of the previous year: a yield of 2.0 t/ha (+ 0.4 %) is expected for wheat crops, whilst for barley the simulations give 2.4 t/ha (+ 1.3 %). The influence of dry and hotter conditions during summer is reflected in a lower expectation for maize yield (3.2 t/ha) compared with the previous year.

Agro-meteorological analysis on eastern European countries for 2003/04

Ukraine and Belarus

In autumn 2003, both countries benefited from good sowing conditions for winter crops (drier before sowing and wetter after) and a milder winter. The spring of 2004 was drier for Ukraine while in Belarus the soil moisture remained at or above the long-term average. For large areas of these countries, rains were reported at around the maturity stage of the winter crops and it was supposed that the harvest conditions were difficult. The forecast wheat yield for Ukraine is 2.3 t/ha (+ 57 %). In both countries the yields of summer crops are expected to be above average (for example an increase of + 47 % above the long-term level is expected for maize in Ukraine).

Russia: good vegetative season

September/October 2004 is the time for summer crop harvesting and for winter crop sowing in all regions of European Russia.

The meteorological conditions were favourable for crop harvesting as well as for winter crop sowing practically everywhere. Soils contained optimal amounts of water in all main crop production regions of Russia. A number of rainy days in the northern Caucasus and central regions of Russia should lead to some delay in summer crop harvesting, but should not affect crop yield. Winter crops were sown in favourable conditions in practically all regions too.

The 2004 vegetative season was in general favourable for crop production in Russia. The meteorological conditions were close to the optimum practically everywhere. Dry conditions were observed only in May/June in the Urals region, which should affect winter and spring crops in this region and should reduce its yield. The amount of precipitation and its temporal distribution was close to optimal for other crops. As a result, the yield of winter cereals in the European part of Russia is likely to be slightly lower than in good previous years. The yield of spring wheat and barley is likely to be higher compared with the previous year but, due to lower amounts of incoming radiation, the quality of grain should be much lower. The yield of potatoes, maize, sunflower and sugar beet is likely to be higher than in previous years in practically all regions of European Russia. A high amount of rain in the central regions of Russia should lead to low sugar content in sugar beet, and should reduce the quality of potatoes.

Agro-meteorological analysis on Maghreb for 2003/04

Maghreb: Good season for Tunisia and Algeria

Higher precipitations than average (+ 40 to + 80 mm) were recorded all over Maghreb in autumn 2003. These replenished the soil water reservoir and the crop sowing and germination took place in optimal conditions.

The winter was quite dry and was followed by a wet spring with precipitations 30 % higher than the seasonal values, wich benefited crop growth.

The summer period was dry in Morocco. In Algeria and Tunisia, the rainfalls were better distributed and benefited the wheat at the maturity stage. In June, some extreme rainfalls (50 to 80 mm/day) were recorded in Tunisia and western Algeria that could have damaged the crops or could have a negative impact on the quality of the harvest.

The temperature remained within the normal range during most of the campaign except at the end of the season where higher temperatures than average were recorded. It boosted crop maturity and in some areas in Morocco it shortened the final storage organ phase, reducing the yield potential. No exceptional heat conditions had affected the crop growth.

The climatic conditions were more favorable for Algeria and Tunisia than for Morocco. The yield expectations are better than average for these two countries. In Morocco, the situation was mitigated, particularly on the western side, due to a dry end of crop cycle.

B. New 2004/05 campaign: 1 September to 10 November

Agro-meteorological overview

Temperature: normal conditions for EU-25 area

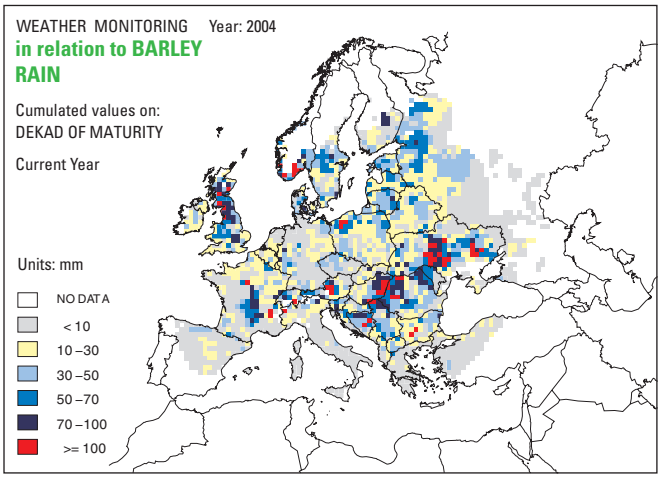
The thermal conditions of this period were close to normal for most of the agricultural areas of the EU-25, except for Finland, the Baltic States, central and eastern Poland, eastern France and large areas of Italy, where it was warmer (+ 10 %) than normal. Romania and Bulgaria were also within the limits of normal temperatures. Large areas of Turkey were warmer than the long-term average. The eastern part of the continent was also warmer than usual (except for southern Ukraine).

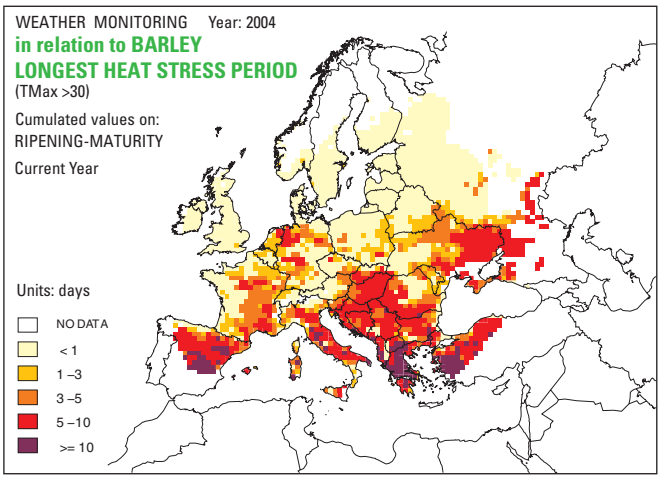
In the eastern and southern areas, temperatures during October were above average by 15 % (more than 55 days additionally cumulated in this month). In south-western Spain and Turkey, during September and first dekad of October, maximum temperatures exceeded peaks of 35 °C.

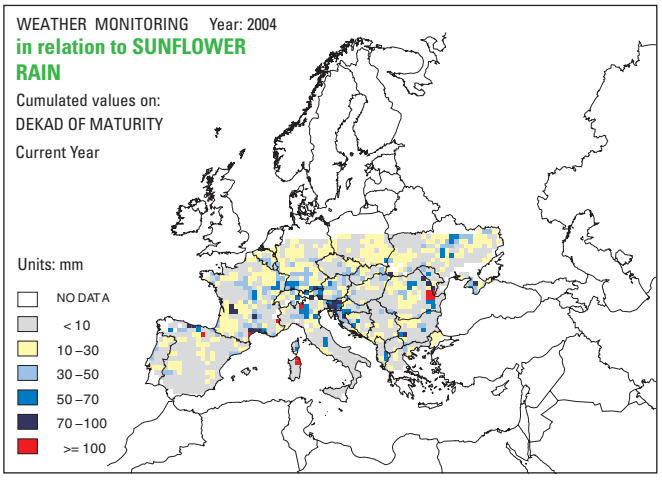
Minimum temperatures of between – 5 and 0 °C were reported for all of central and eastern Europe, Turkey, Germany, northern Italy, south-western France, the northern UK and central Spain.

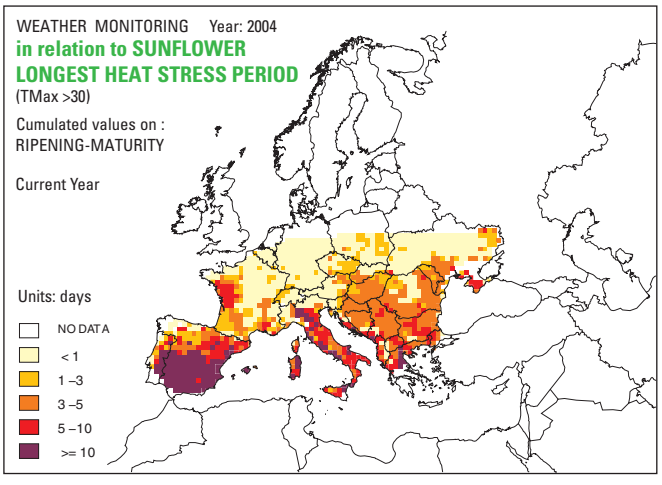
Rain: generally drier conditions but rainy spots present

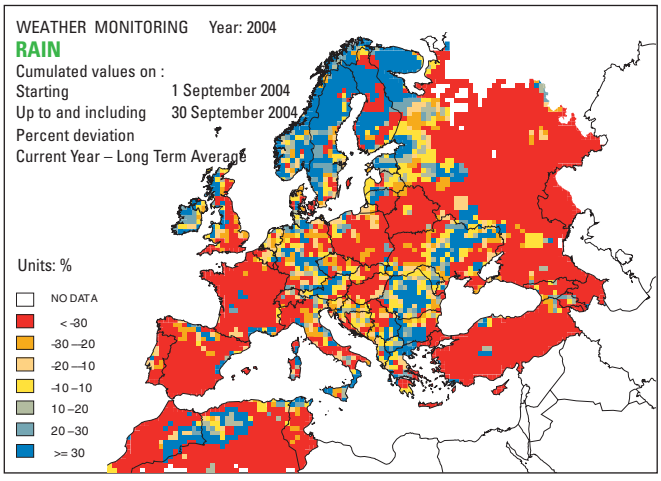
At continental scale, this period may be considered rather drier but one may notice a lot of wetter than normal spots in northern and western parts of the UK (October), eastern Ireland (all the period), northern Portugal (especially in the last dekad of October), the southern Scandinavian peninsula, western France, Sardinia, central Italy, central and western Romania, Slovenia, Croatia and Serbia. In some Balkan areas, likely sowing operations were shifted by about one week, but generally a beneficial effect is expected for winter crops' germination. Due to unusually dry conditions, a negative impact on topsoil moisture is expected for areas in southern Spain, where the soil preparation for winter crops has started, and also for the whole of Turkey, where the winter crops were already sown in October.

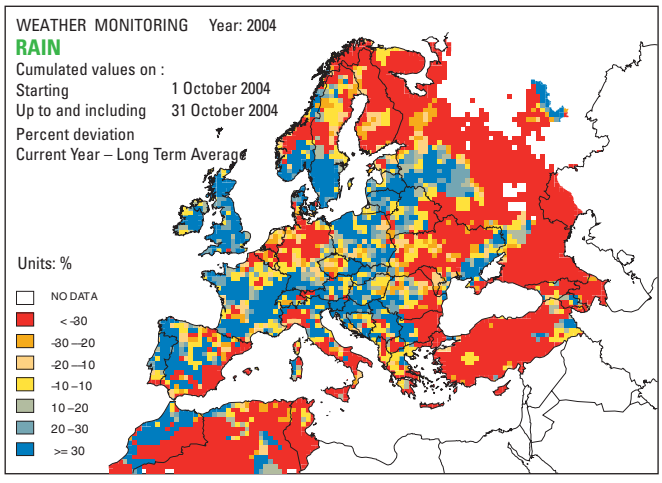


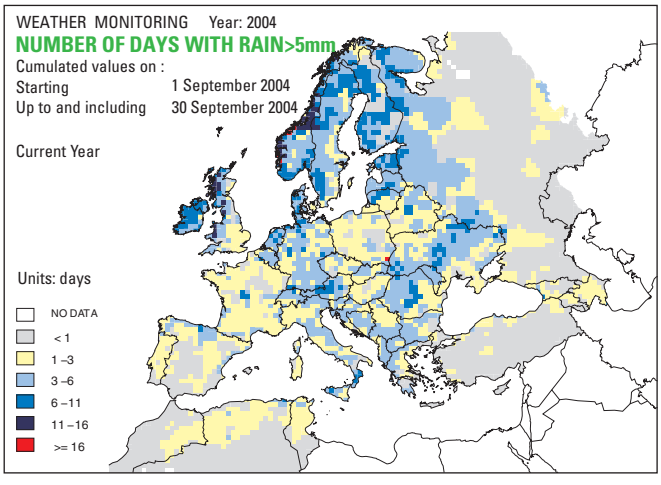


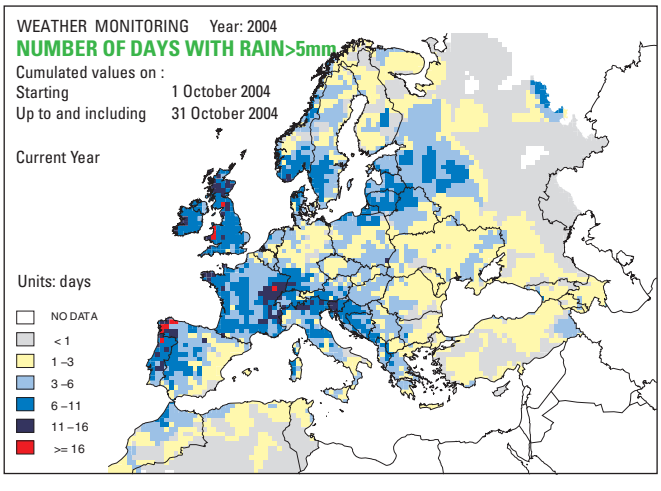












Winter crop sowing overview — Autumn 2004

EU-25

Winter wheat

Generally good conditions for early sowing (except western France, northern Portugal and Slovenia); relatively dry in central and eastern EU countries; wet in Portugal and northern Spain

In the majority of the EU, the early sowing benefited from optimal conditions: the scarce rainfalls in August and September facilitated field preparation and the following wet conditions (particularly in October) and good thermal conditions accelerated the emergence of the plants that could reach an advanced stage before the colder November. Only in western France (Aquitaine, Poitou-Charentes, Pays de la Loire, Bretagne), northern Portugal and Slovenia did the rain (both in term of quantity and frequency) hinder early sowing activities.

In Portugal and northern Spain, as well as in central Italy, Slovenia and south-western France (Midi-Pyrenees), the unfavourable weather conditions persisted also during the canonical sowing period. In those areas (except for central Italy) much better conditions were present during the traditional delayed sowings period.

Ireland and the Balkan countries presented optimal weather conditions but, with regard to the very early sowings (end of August), the persistent rains in the following months permitted only a very short period available for effective sowings.

Benelux and north-western Germany were affected by suboptimal wet conditions during the normal period of sowing (the first half of October and second half of September, respectively). While the soil moisture decreased in Belgium just after the expected period of sowing, allowing for an acceptable climatic window, in north-western Germany the wet conditions persisted, resulting in delays or missed sowings.

In all the other EU countries in general the weather conditions did not represent an obstacle for optimal field preparation, sowing and emergence.

Durum wheat

The durum wheat area in southern Europe also benefited from the wet conditions of October that replenished the topsoil moisture before sowing. Good precipitations were also recorded in Morocco to refill the water reserve before the sowing of November. In contrast, Tunisia experienced insufficient water supplies in October.

Winter barley

Wet sowing in Europe; more favourable for early or delayed sowings

Barley matched optimal conditions only for early sowings and in particular in the central and eastern countries with the exception of Slovenia, south-western France (Aquitaine, Midi-Pyrenees) and Portugal, where the rainfalls were excessive.

In October, the persistent and abundant rains did not permit (especially in western Germany, Slovenia, France, Belgium, Great Britain and Ireland) effective sowings during the most common period.

Vice versa, the late sowings period presented generally favourable conditions, except in Ireland, southern France (Rhone valley, Midi-Pyrenees), northern Italy, Slovenia and Scotland.

The first dekad of November was favourable both for the already sown areas in the central and eastern EU countries (warmer than average temperatures and good water supplies) and also for the western EU countries (drier than expected and normal temperatures) where sowing activities were still in progress.

Rapeseed

Dry early sowing, too wet in the eastern EU

The August sowings (especially in northernmost areas) were made in sub-optimal wet conditions and in some cases had to be postponed to the beginning of September. During that month the sowings were made in almost optimal conditions. Late sowings were likely to find excessive topsoil moisture, especially in central and eastern EU.

Candidate countries

Before and during the sowing of winter wheat, some showers occurred in Romania, except in the southern areas where the weather was more favourable for this activity. In the dekad after canonical sowing, the central areas of the country received some beneficial light rains (providing up to 30 mm). The sowing of winter barley in Romania was preceded by light rain in the central and southern areas. After this period, the weather became rainy for most of the country (excepting southern areas) but the sowing was still possible during some dry 'windows'.

During the sowing period of winter wheat, most of Bulgaria received some light rains but it is expected that a negative influence was effective only in a limited area in the west. Rains after sowing are depicted only for southern Bulgaria. The sowing period for barley was generally dry.

The sowing of winter crops in Turkey was performed under dry conditions.

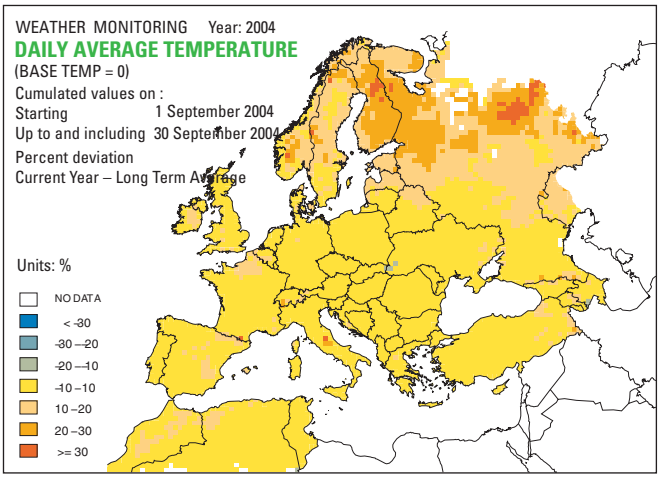
Eastern countries

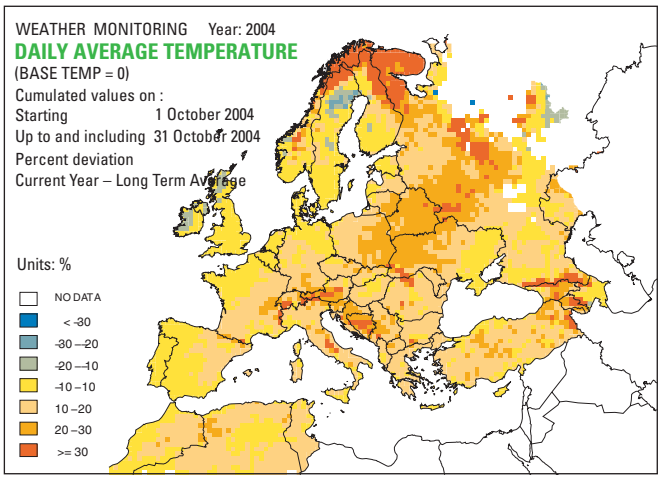
Light rains occurred before the sowing of winter crops in central and northern Ukraine and in the north of Belarus. The weather was generally favourable for barley (dry during sowing and wetter during germination), so a good emergence of this crop may be expected. For winter wheat, some rains were reported in northern Belarus and in some areas of southern Ukraine during the usual sowing period. Some regions from central Belarus and south-eastern Ukraine did not benefit from post-sowing precipitation but the soil humidity may be considered as sufficient for normal germination and emergence.

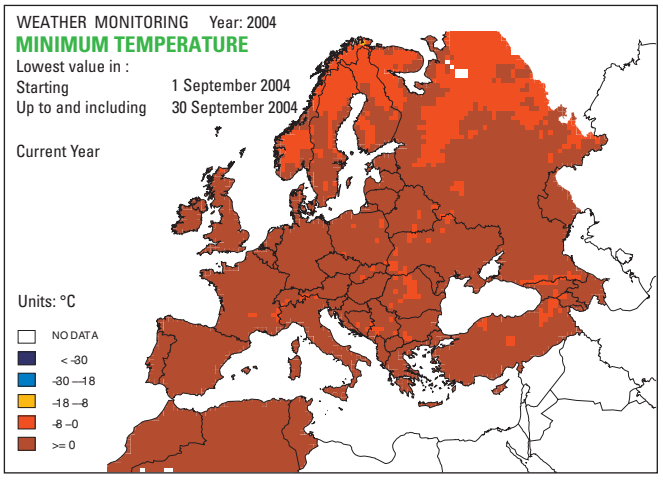
Maghreb

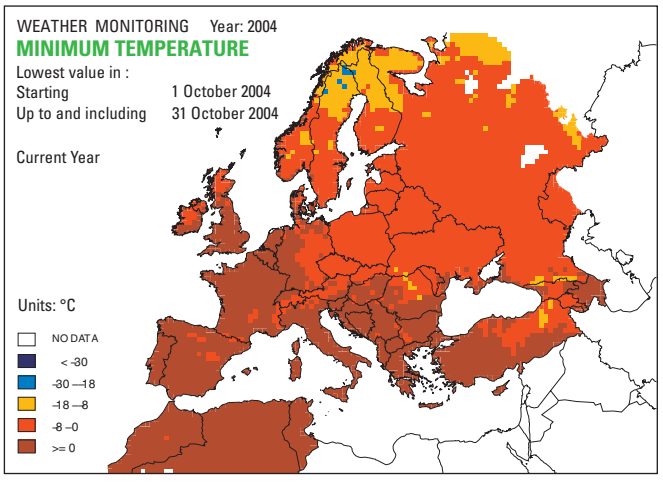
After a dry period, Morocco received abundant rainfalls in October (more than 60 mm) and the beginning of November that replenished the soil moisture. It will benefit the new sowing that will start in optimal conditions.

The weather was drier in Algeria and Tunisia but was still favorable for the wheat sowing, which usually takes place earlier than in Morocco. The crop benefited, during germination, from significant rainfalls at the end of October and beginning of November.





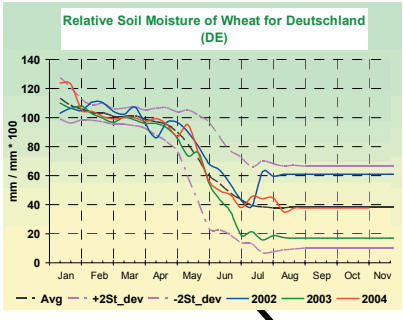


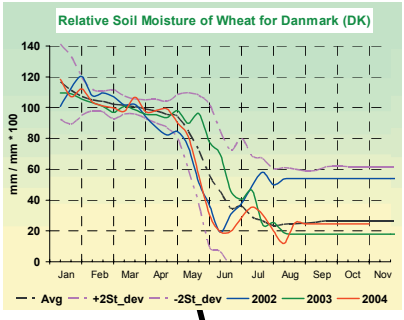


Agro-meteorological CGMS

Wheat and Maize

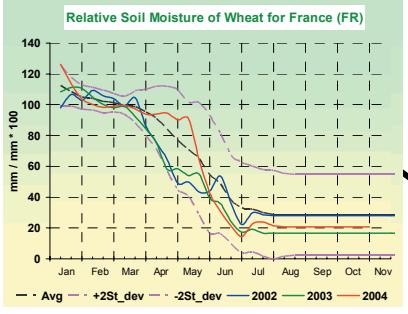
Soil moisture

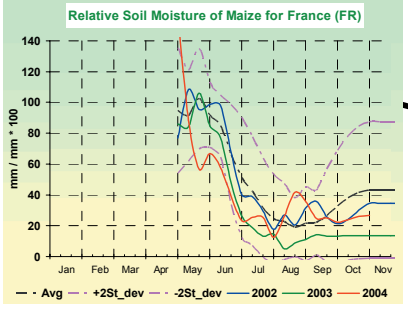


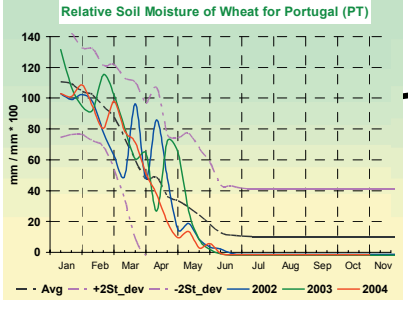


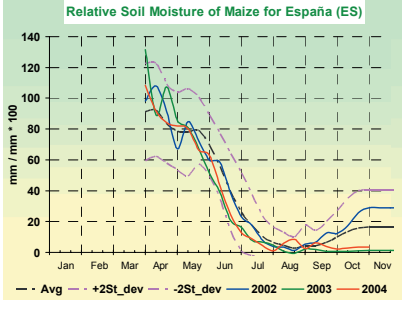
CLIMATIC WATER BALANCE
Cumulated values on:
Starting 01-JAN-2004
up to and including 30-SEP-2004

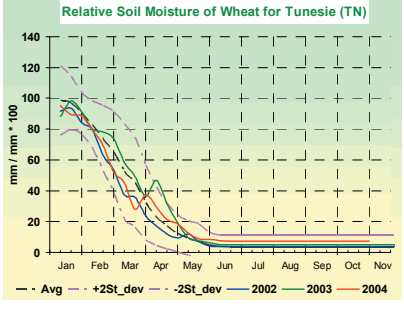
Percent Deviation:
Current year – Long Term Average

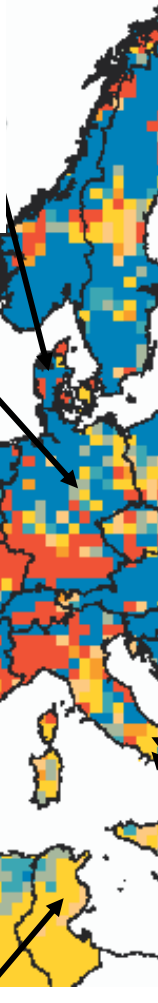








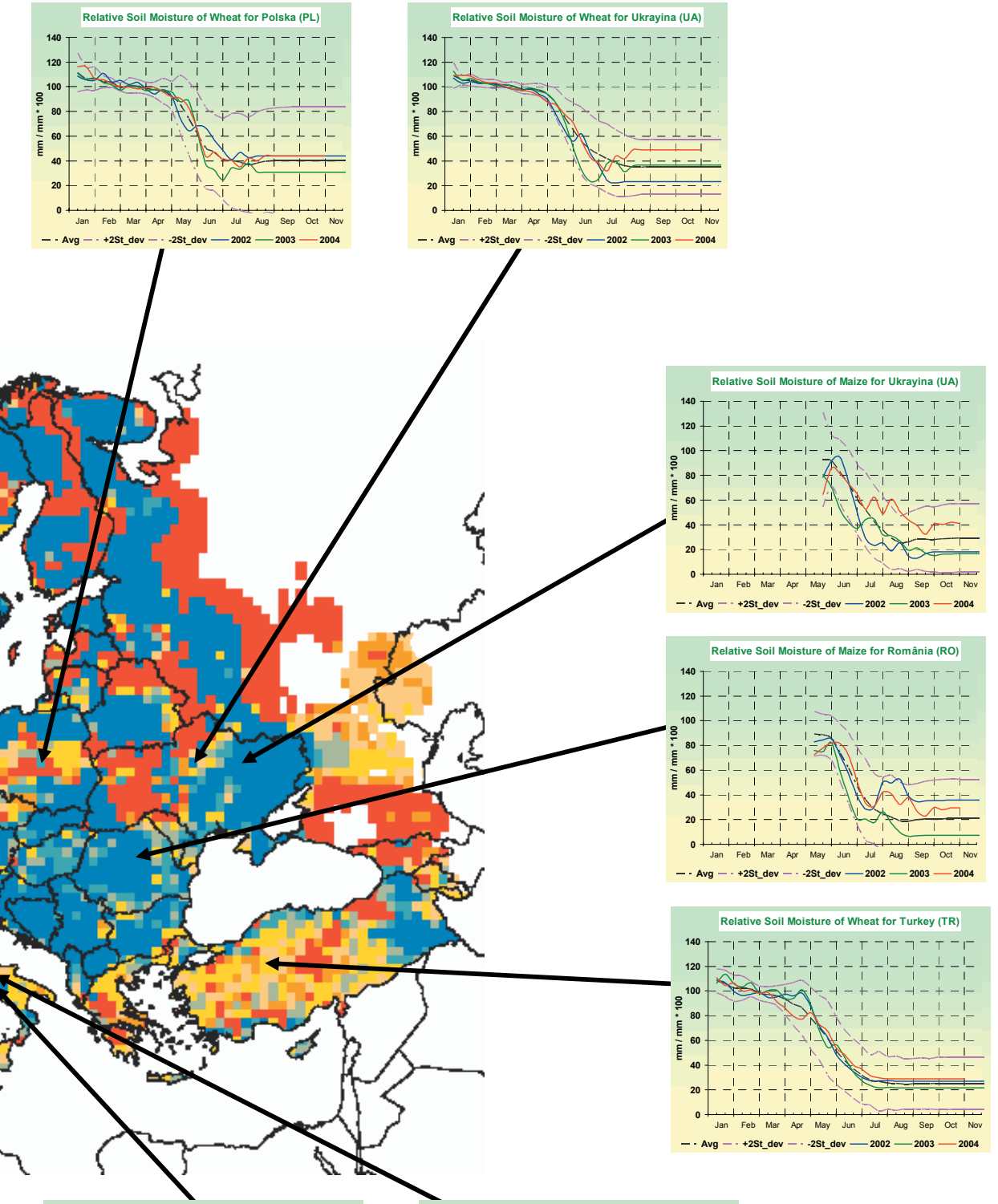




Units perc.

- NO DATA
- < -30
- -30 - -20
- -20 - -10
- -10 - 10
- 10 - 20
- 20 - 30
- >= 30

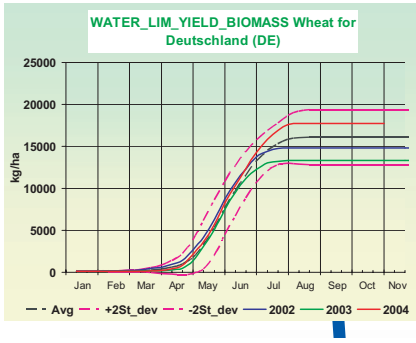
simulations — Campaign 2003/04

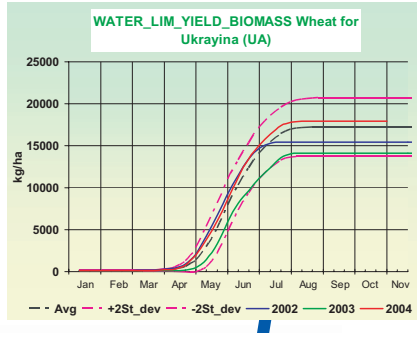


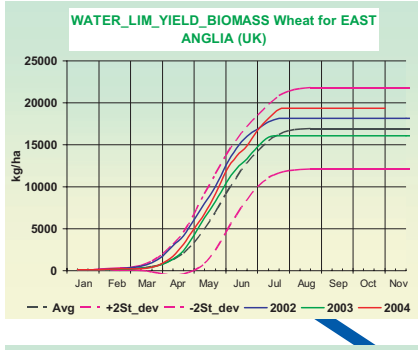
Agro-meteorological CGMS

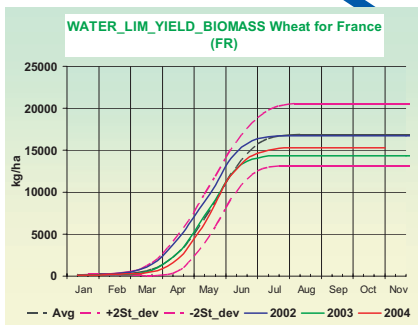
WHEAT

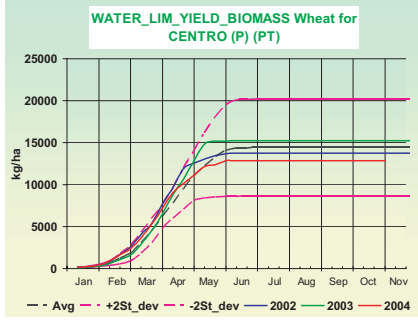
BIOMASS





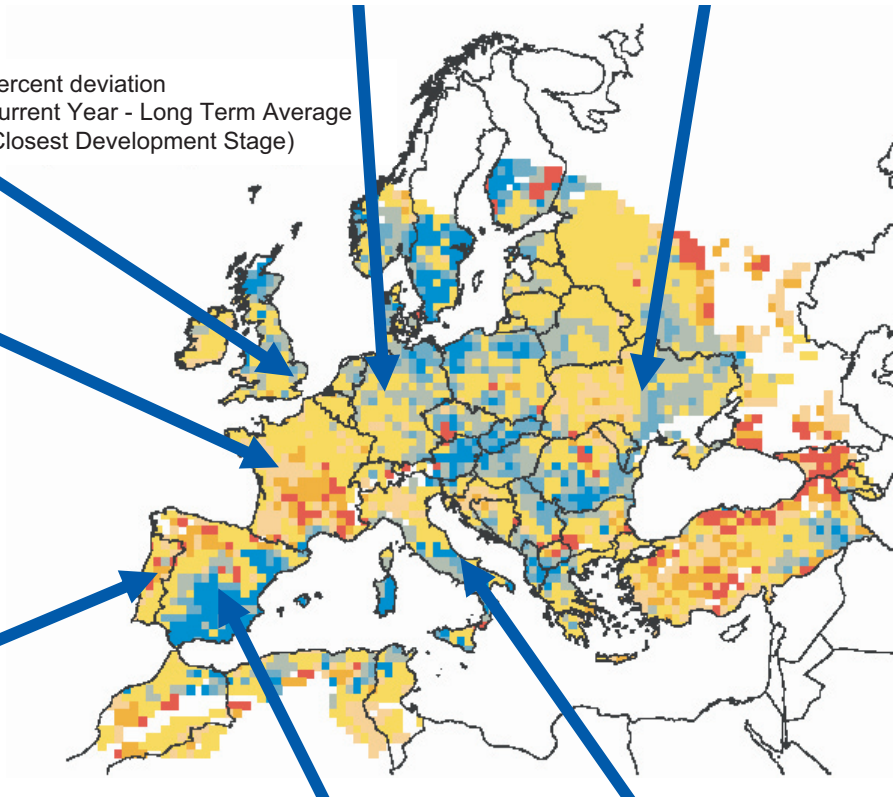






CROP MONITORING Current Year: 2004
WHEAT
ABOVE GROUND BIOMASS (Water limited production)
Status on: third dekad - October - 2004

Percent deviation
Current Year - Long Term Average
(Closest Development Stage)



Units perc.

- NO DATA
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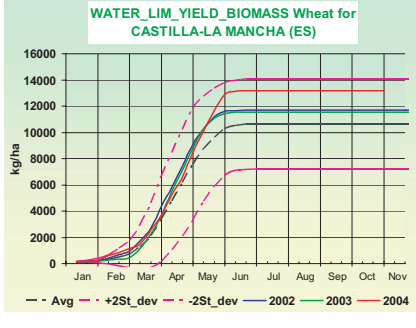
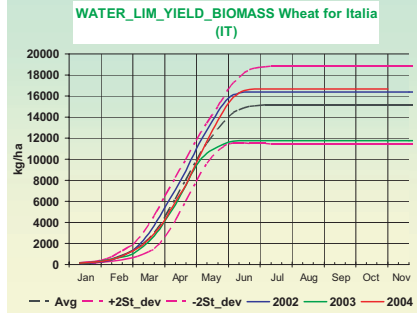
- -30 - -20
- -20 - -10
- -10 - 10
- 10 - 20
- 20 - 30
- >= 30





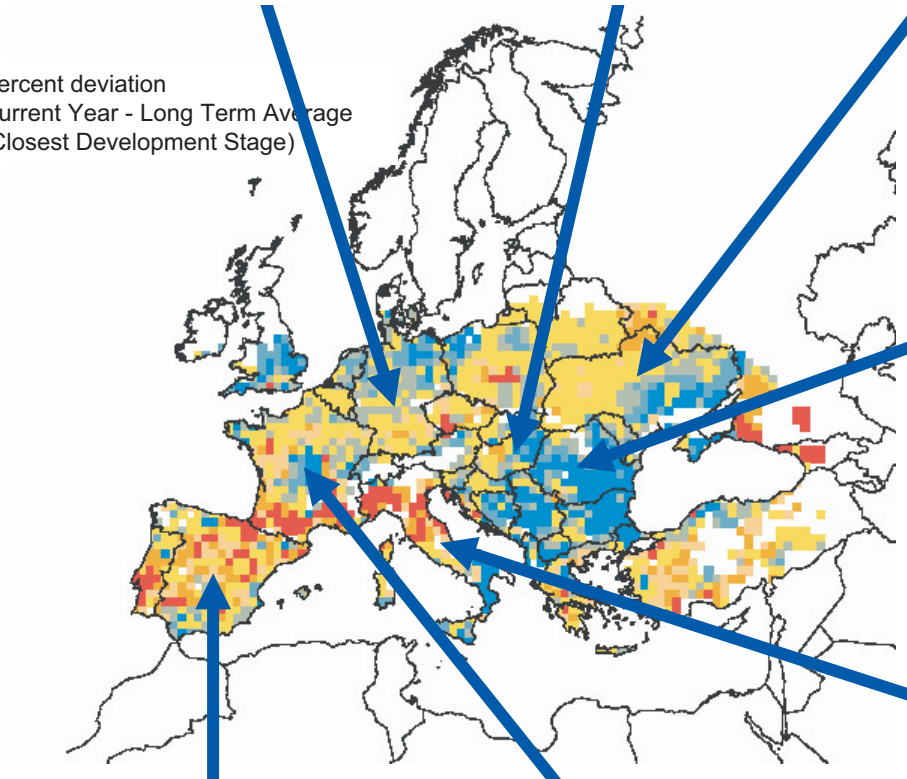
simulations — Campaign 2003/04

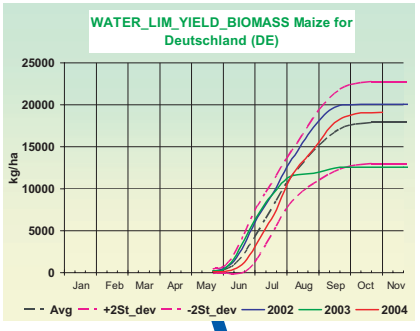
MAIZE

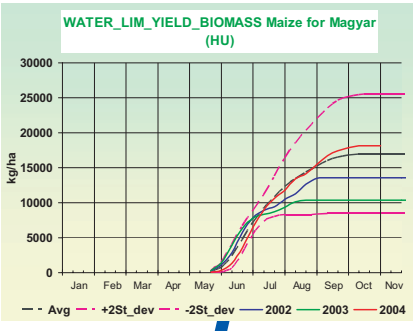
BIOMASS

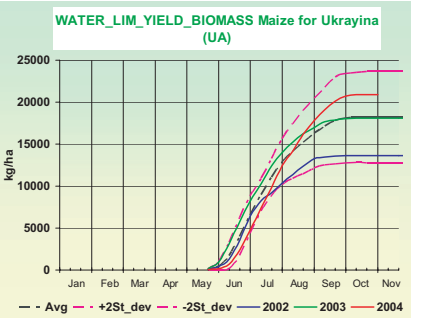
CROP MONITORING Current Year: 2004
MAIZE
ABOVE GROUND BIOMASS (Water limited production)
Status on: third dekad - October - 2004

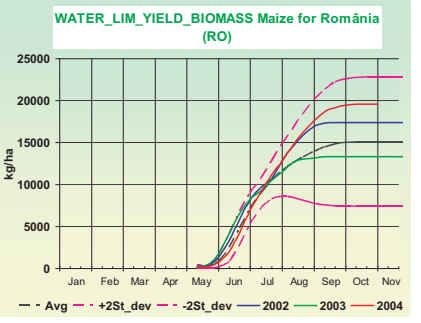
Percent deviation
Current Year - Long Term Average
(Closest Development Stage)

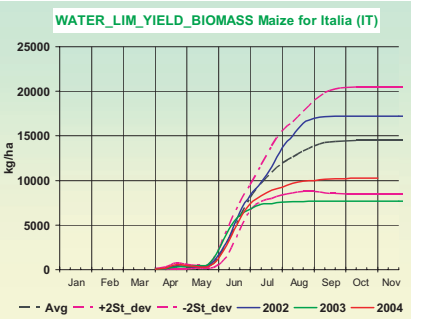


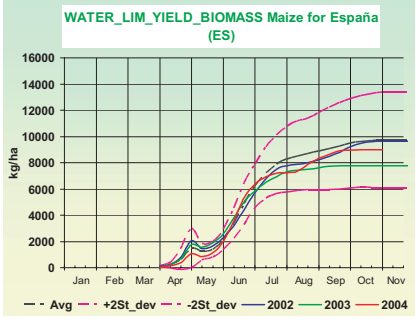


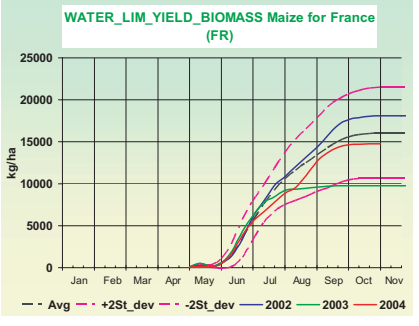










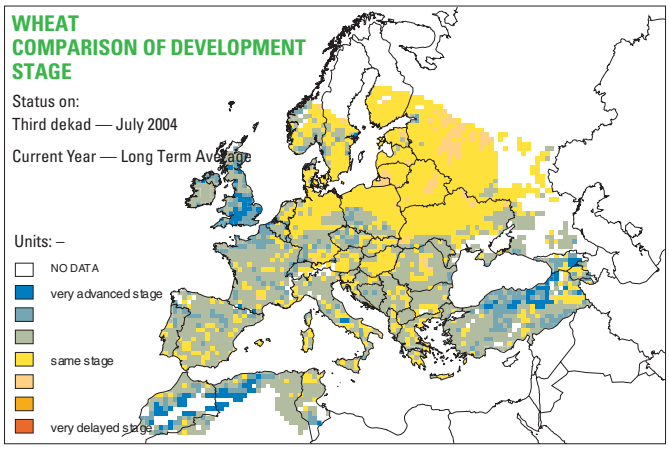


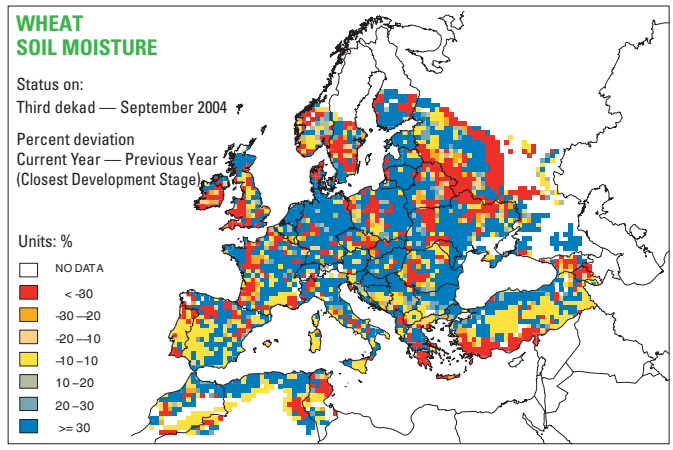
Units perc.

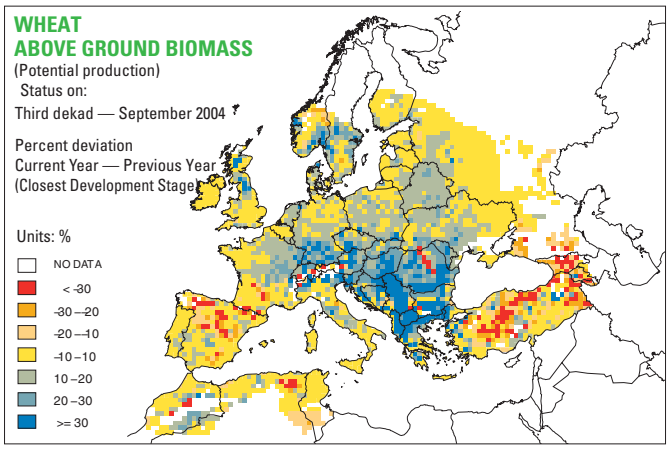
NO DATA
< -30
-30 - -20
-20 - -10
-10 - 10
10 - 20
20 - 30
>= 30

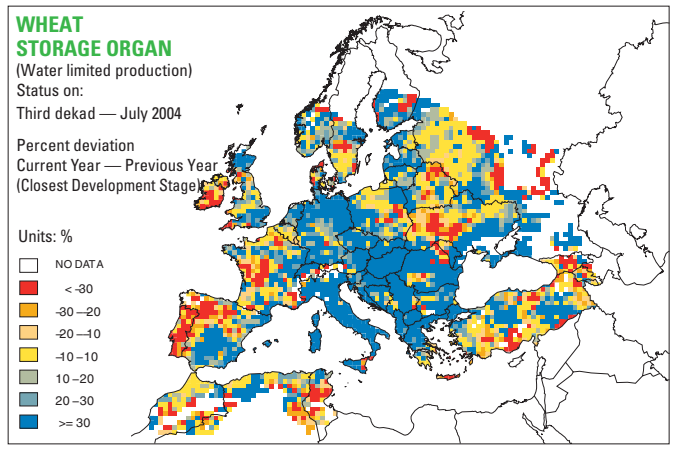
Agro-meteorological CGMS

Wheat

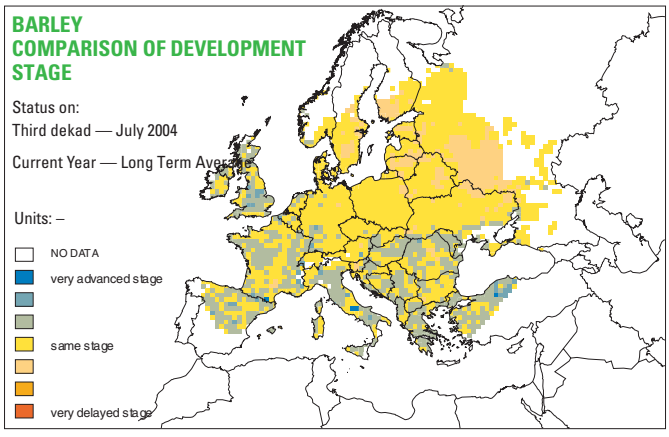


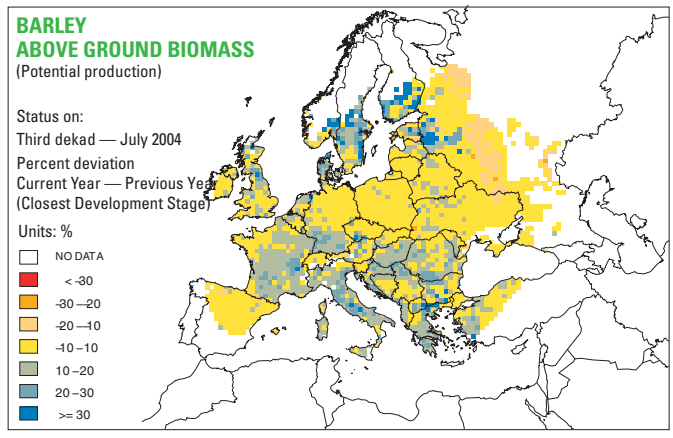




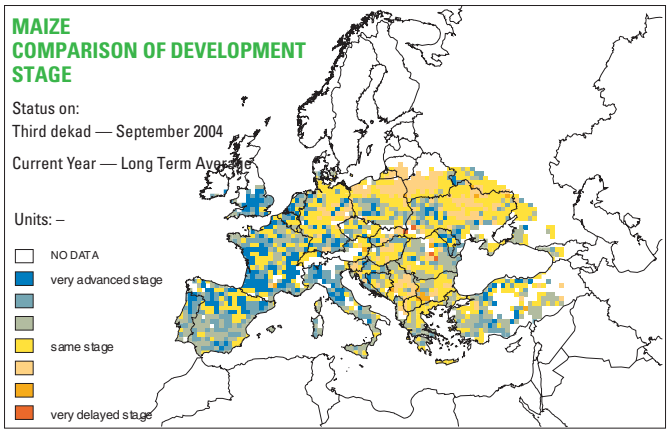


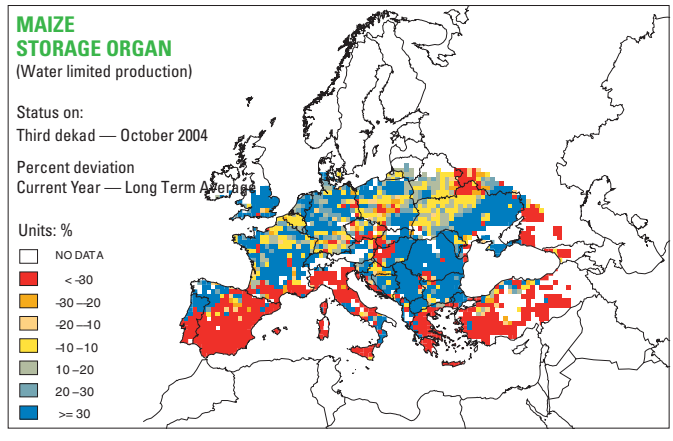
Barley





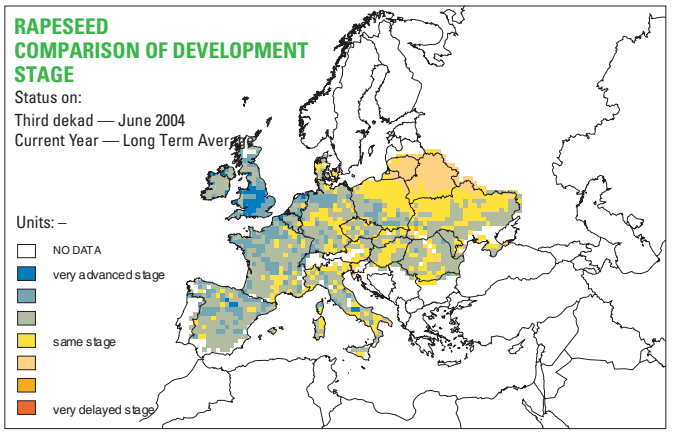
Maize

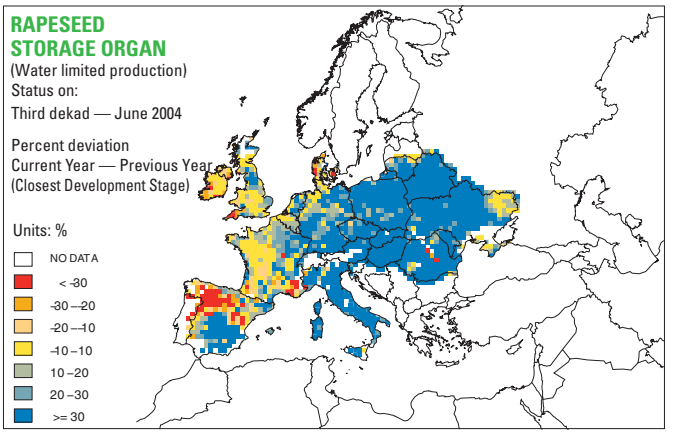




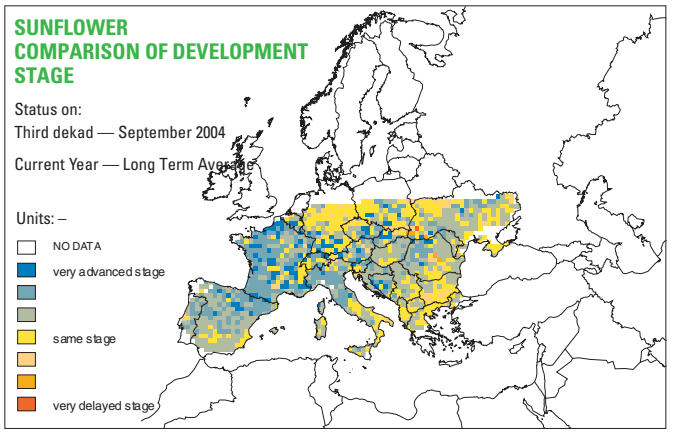
simulations — campaign 2003/04

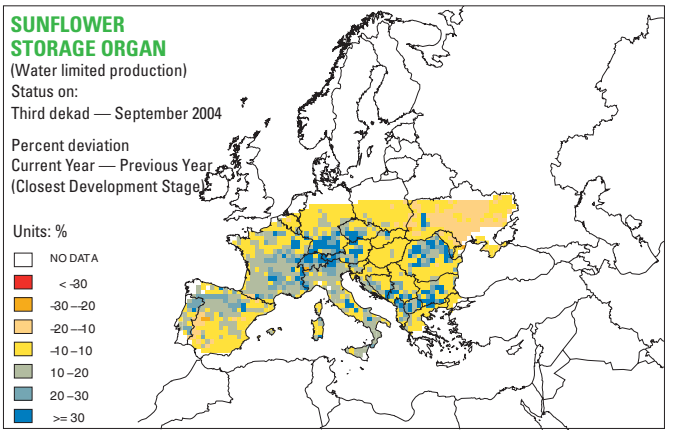
Rapeseed



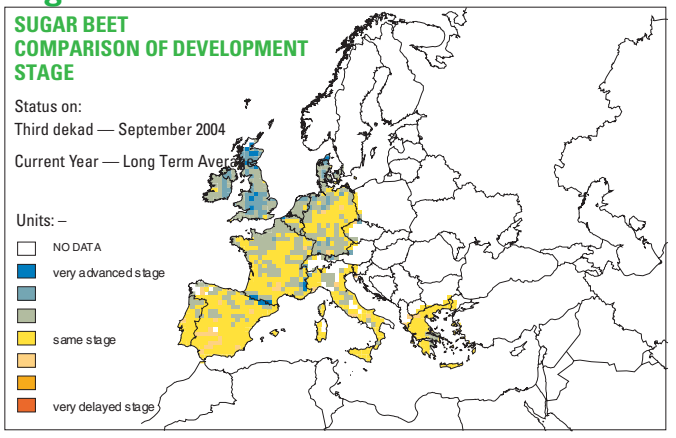


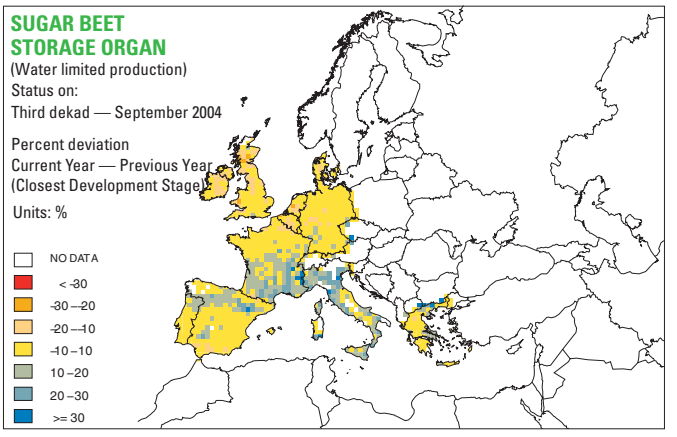
Sunflower



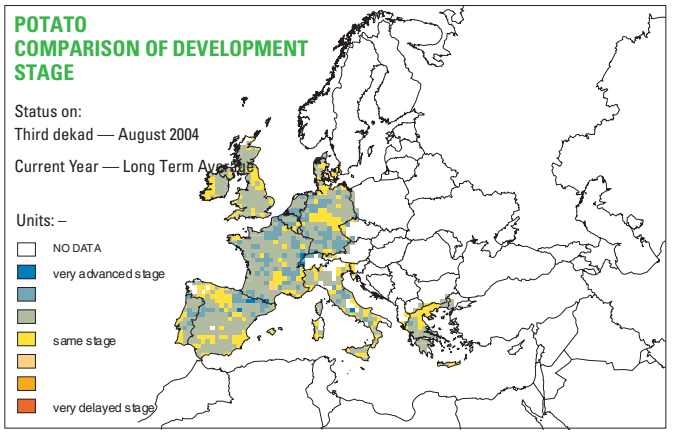


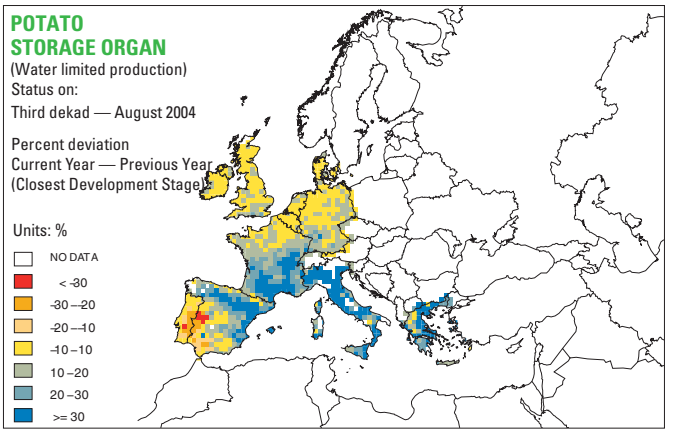
Sugar beet

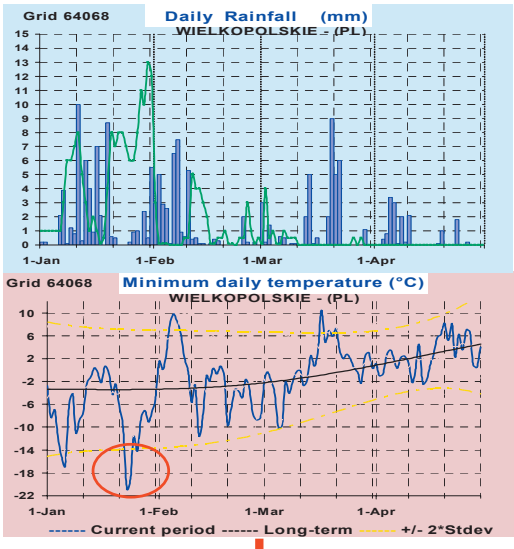


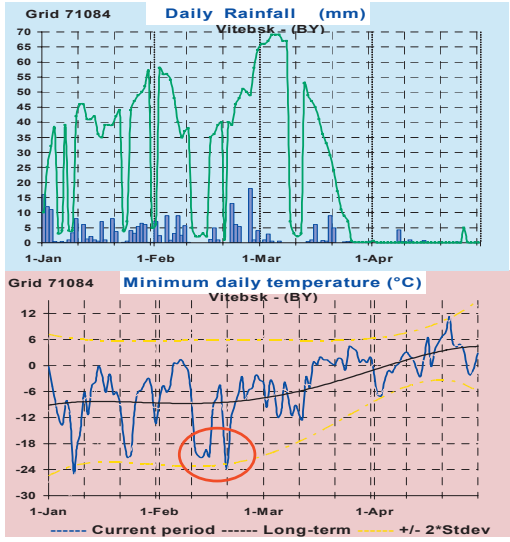


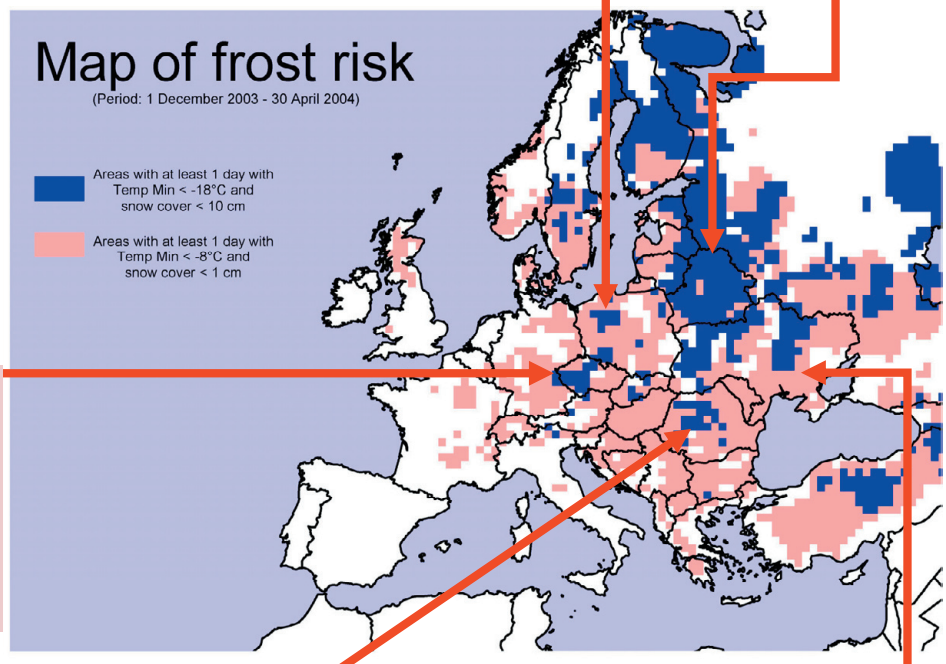
Potato

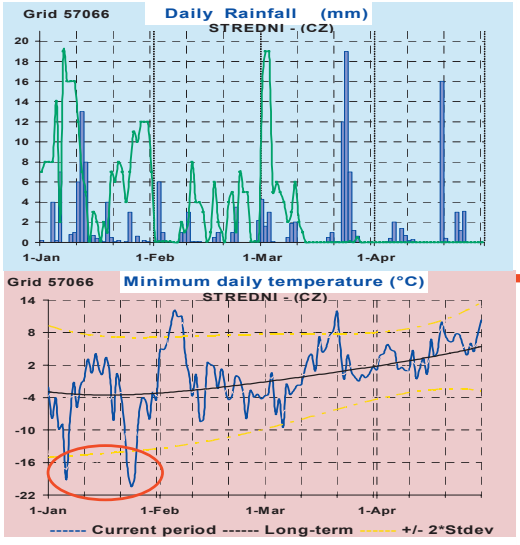


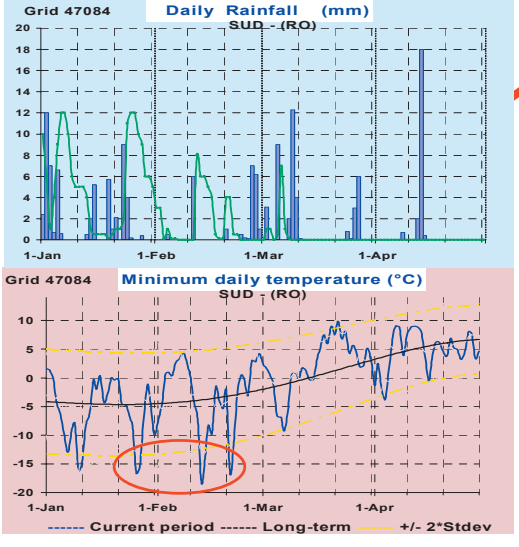


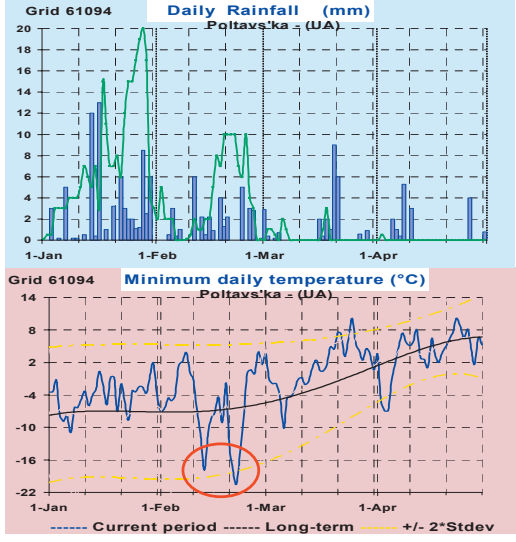

Grid 64068
Daily Rainfall (mm)
WIELKOPOLSKIE - (PL)
Grid 64068
Minimum daily temperature (°C)
WIELKOPOLSKIE - (PL)
1-Jan
1-Feb
1-Mar
1-Apr
Current period
Long-term
+/- 2*Stdev


Grid 71084
Daily Rainfall (mm)
Vitebsk - (BY)
Grid 71084
Minimum daily temperature (°C)
Vitebsk - (BY)
1-Jan
1-Feb
1-Mar
1-Apr
Current period
Long-term
+/- 2*Stdev


Map of frost risk
(Period: 1 December 2003 - 30 April 2004)
Areas with at least 1 day with Temp Min < -18°C and snow cover < 10 cm
Areas with at least 1 day with Temp Min < -8°C and snow cover < 1 cm


Grid 57066
Daily Rainfall (mm)
STREDNI - (CZ)
Grid 57066
Minimum daily temperature (°C)
STREDNI - (CZ)
1-Jan
1-Feb
1-Mar
1-Apr
Current period
Long-term
+/- 2*Stdev

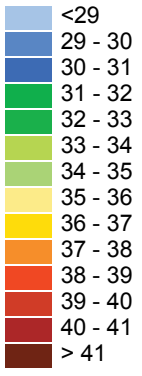

Grid 47084
Daily Rainfall (mm)
SUD - (RO)
Grid 47084
Minimum daily temperature (°C)
SUD - (RO)
1-Jan
1-Feb
1-Mar
1-Apr
Current period
Long-term
+/- 2*Stdev

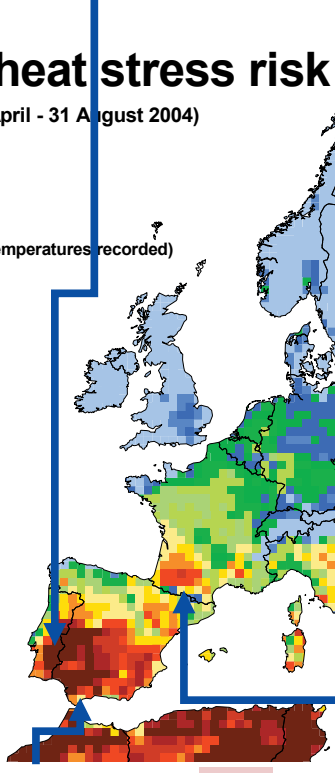

Grid 61094
Daily Rainfall (mm)
Poltavs'ka - (UA)
Grid 61094
Minimum daily temperature (°C)
Poltavs'ka - (UA)
1-Jan
1-Feb
1-Mar
1-Apr
Current period
Long-term
+/- 2*Stdev

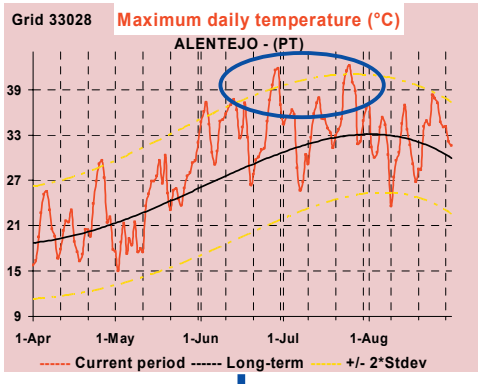
Map of heat stress risk

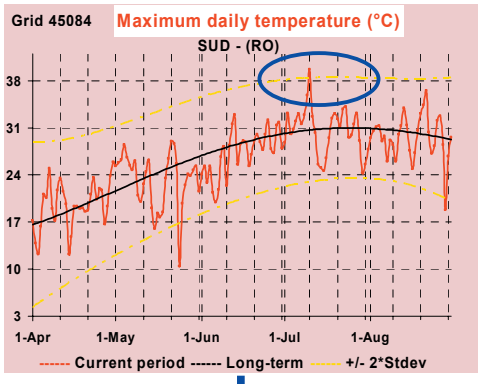
(Period : 1 April - 31 August 2004)

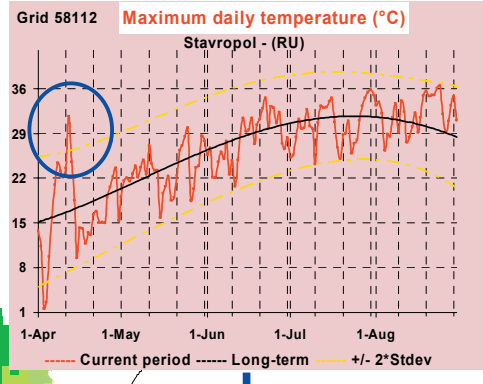
(Absolute maximum temperatures recorded)

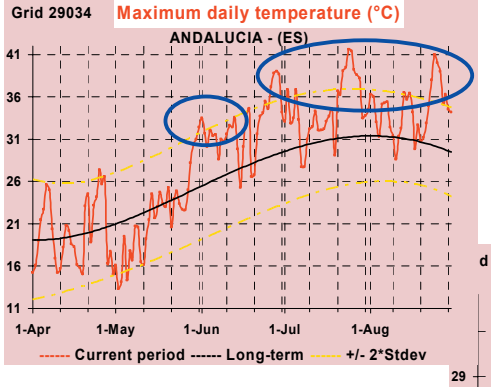


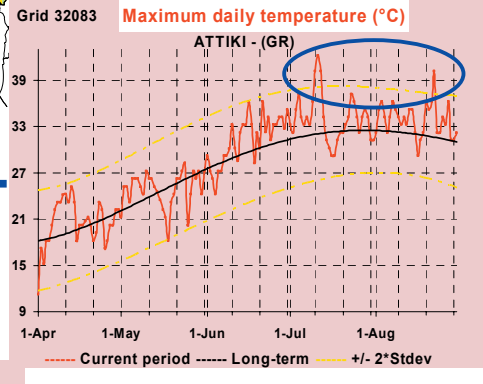


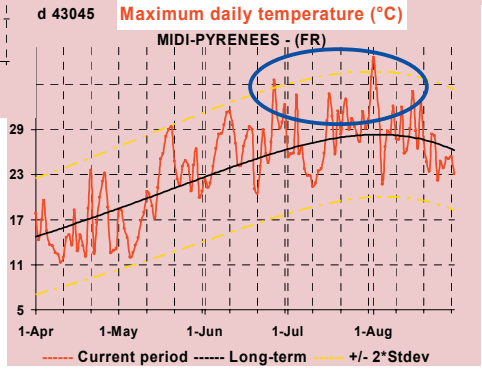






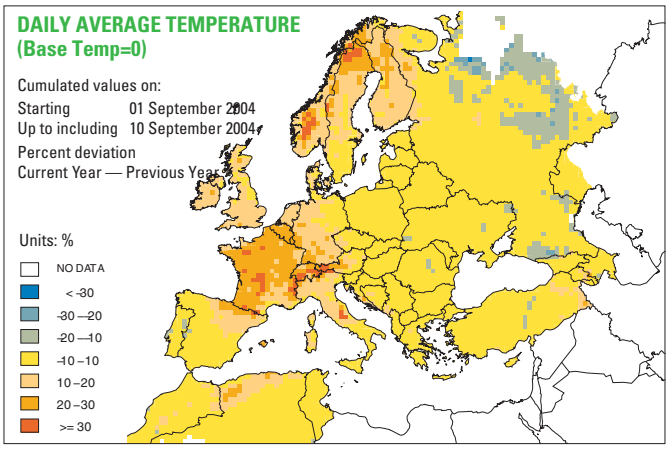


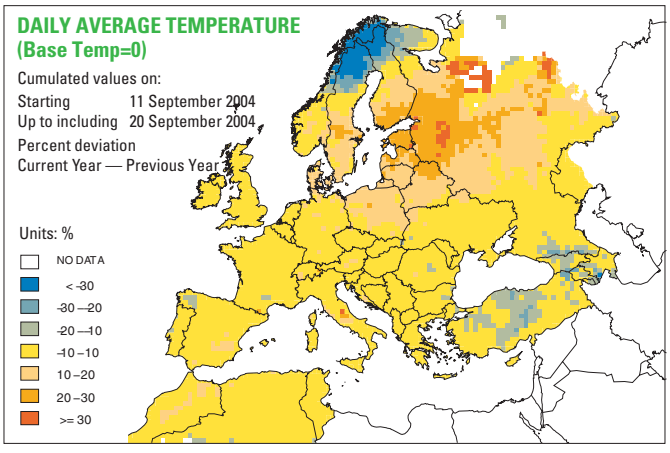


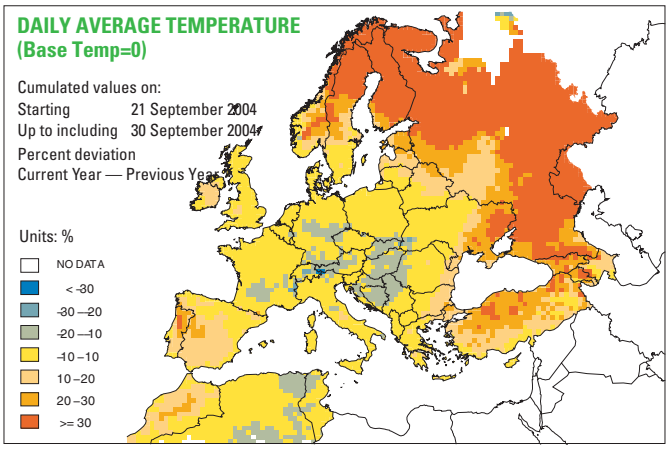


Ten-day period temperature maps — New campaign

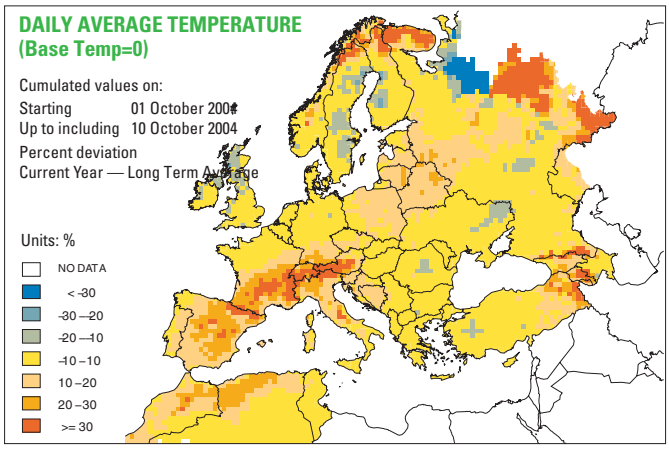
September 2004

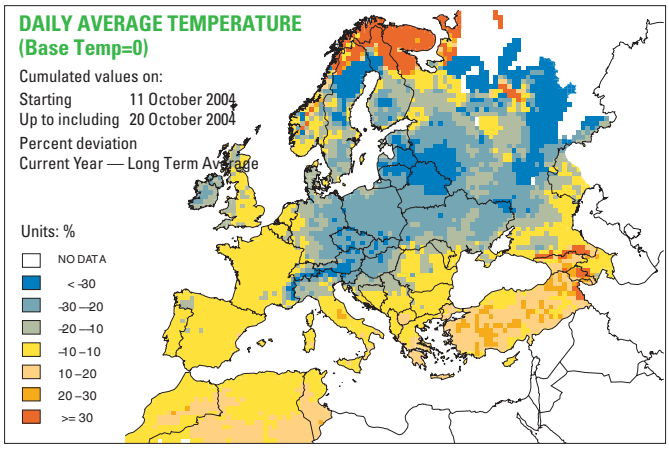


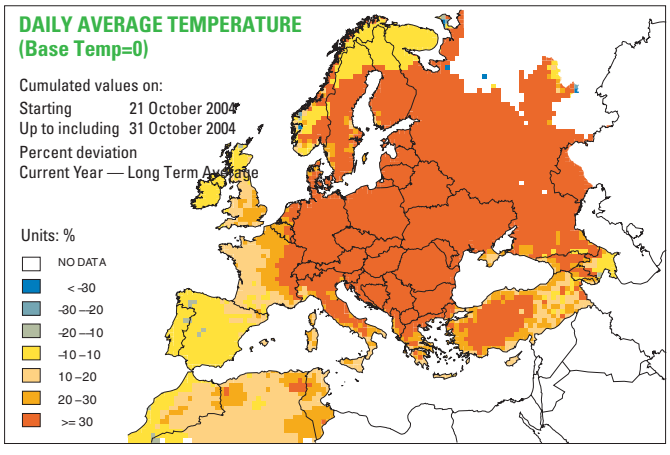




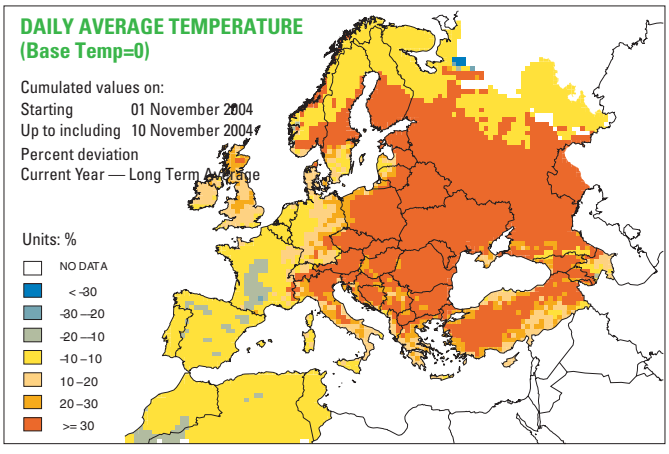
October 2004





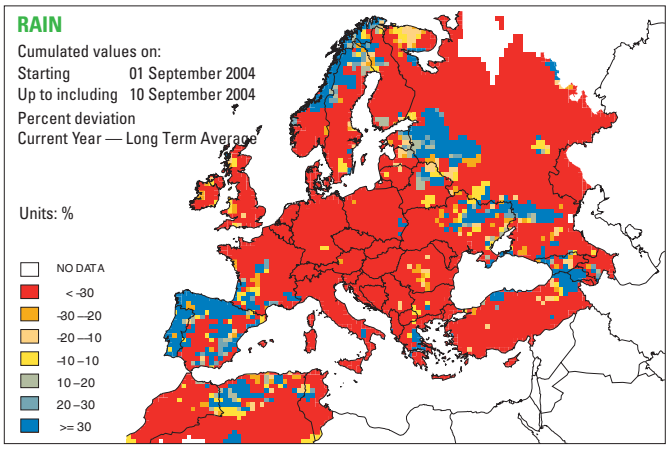


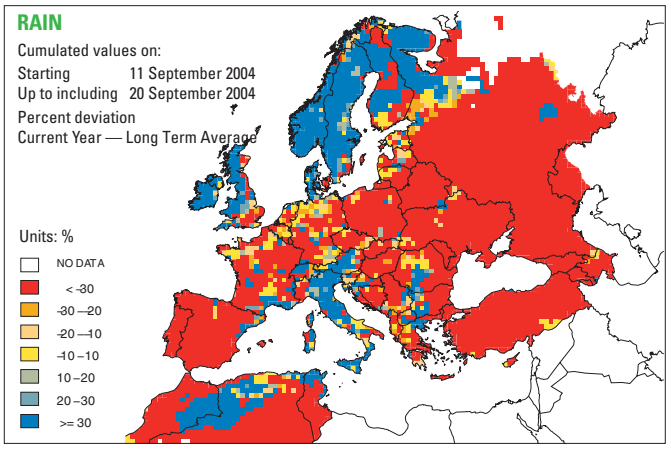
November 2004

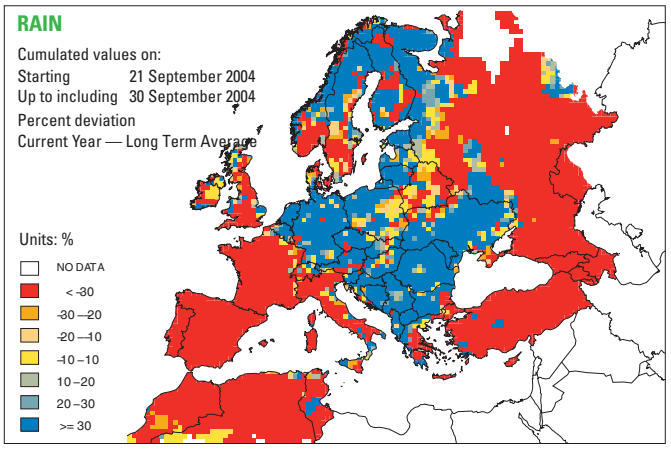


Ten-day period rain maps — New campaign

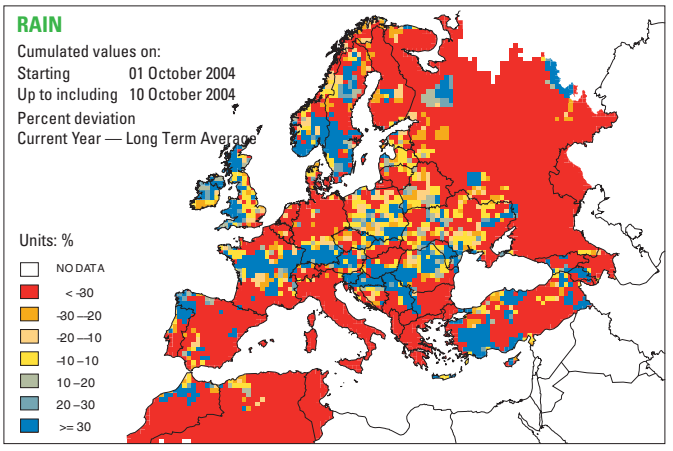
September 2004

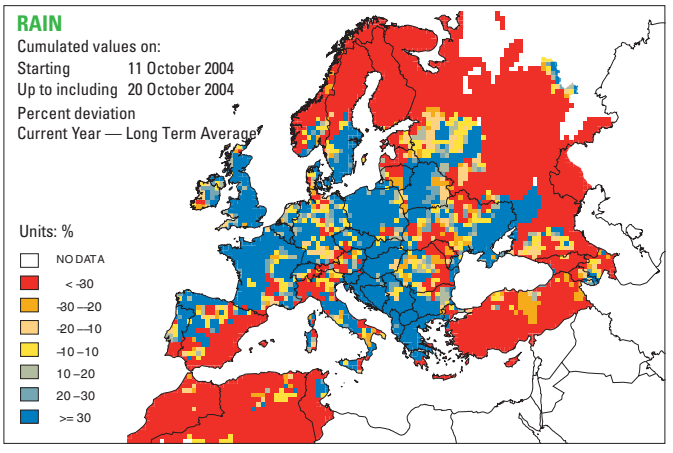


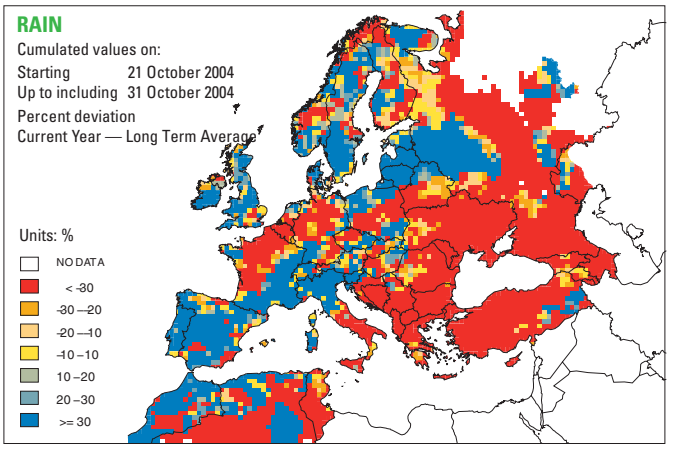




October 2004







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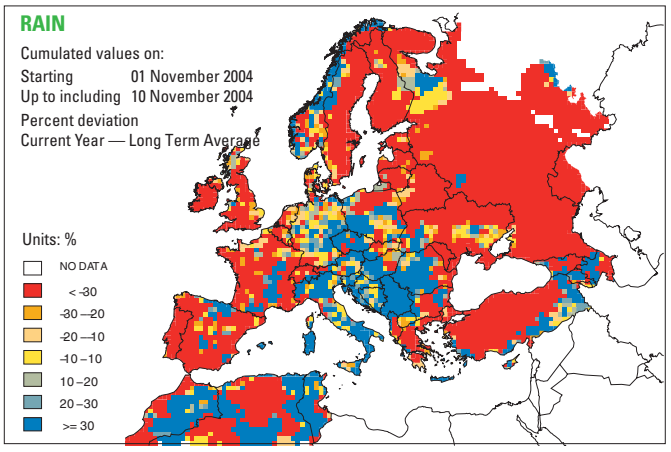
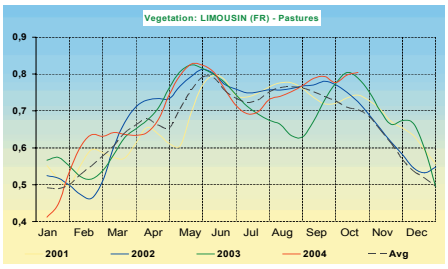
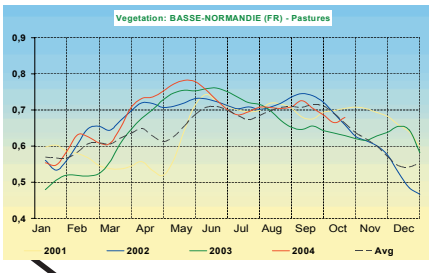
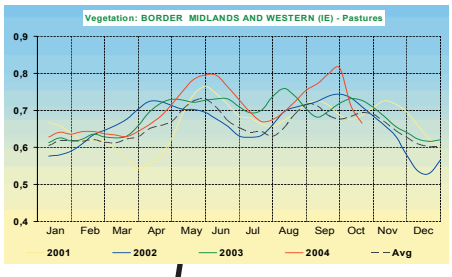
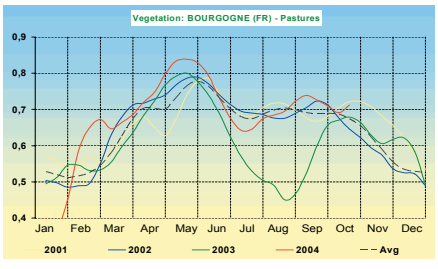


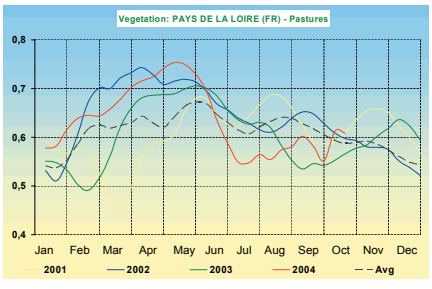
Spot/vegetation satellite

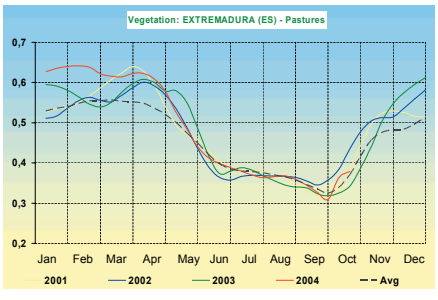


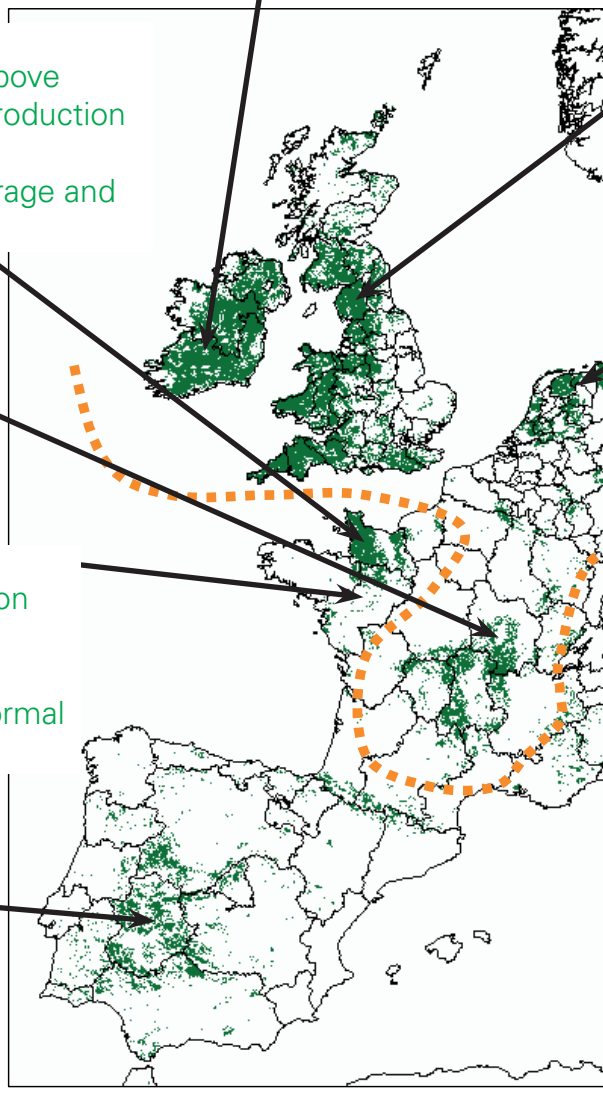












Zone 1
Spring: Normal to above average biomass production

Summer: Above average and increasing

Zone 2
Summer: Biomass production on average

Spring: Normal to above normal biomass levels

The profiles of CNDVI (Corine normalised difference vegetation index) are obtained by un-mixing the NDVI through the Corine land cover database, exclusively on the type 'Pastures number: 2.3.1'. The profiles show the vegetation cycle during the last four seasons, including the ongoing 2003/04 season.

Zone 1 — North central Europe and the British Isles: normal to above average biomass levels in spring and increasing production of biomass up to August

In **the Midlands, western** (Ireland) **and Northern Ireland** (UK) all curves show **above average biomass production, especially during the period April to September.** A more normal situation can be observed in the remaining part of the season. At the onset of autumn (end of September), production experiences an absolute maximum followed, however, by a sudden drop in the vegetation curve, which can be explained by persistent cloud cover during that period.

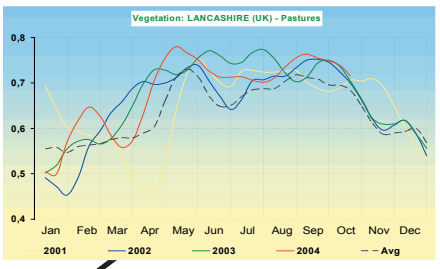
In **south-western Scotland** and **north-western England** (UK) the situation is comparable to that of Ireland with **above average biomass production** all through the season and a sudden drop at the onset of autumn.

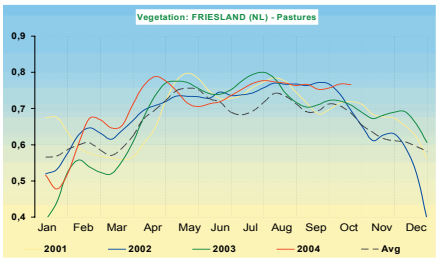
In **eastern Wales, western England and Cornwall** (UK) the curves show above average biomass production across the season, topping at the end of summer and, though a sudden drop can be observed around mid-September, **the level of biomass production remains rather favourable.**

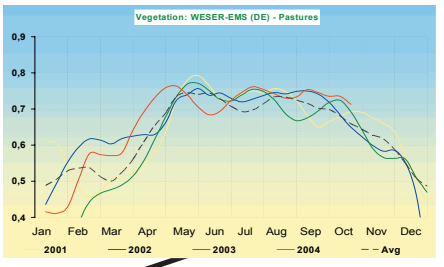
In **central France (Auvergne, Limousin and Bourgogne),** the index followed a normal seasonal pattern for the initial part of the campaign. As in previous seasons, it experienced a marked decrease around mid-June, with a recovery towards the end of summer. Here, as in other areas, a sudden and sensible drop in the level of production can be observed in late September.

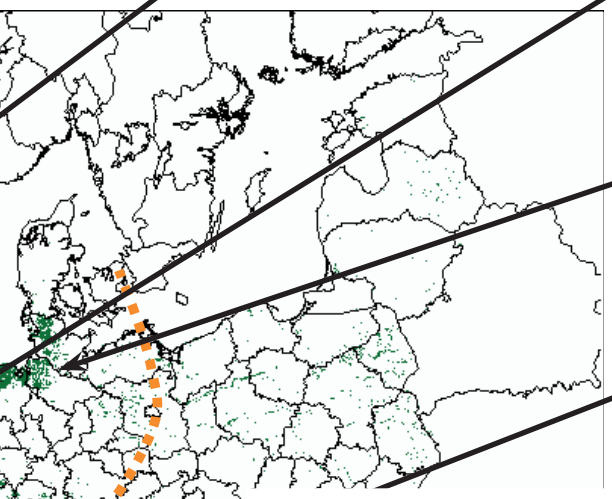
For **Friesland** (the Netherlands) and **north-western Germany** (Germany), the general trend shows **above average levels of biomass production in summer.**

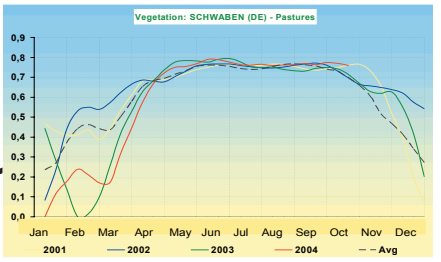
information on pasture

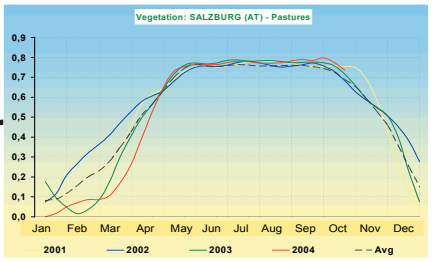








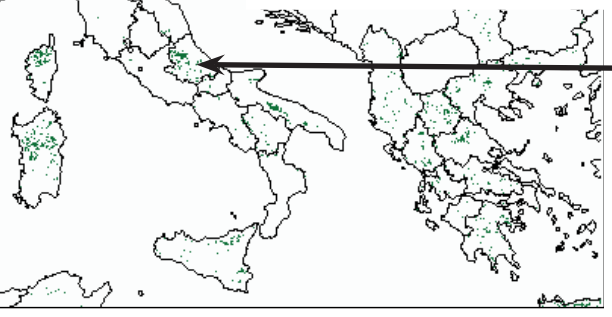


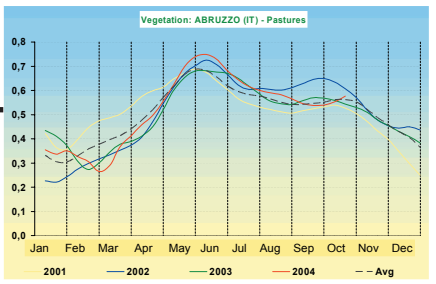


Zone 3

Spring: Strong decrease of biomass production as compared with average

Summer: The production level recovered, stabilising on normal levels





This continued throughout August and reached an absolute peak in September. A steep drop follows, though biomass production seems to stabilise at around average levels in autumn.

Zone 2 — South-western Europe: above average biomass levels in spring and normal to below average levels in summer and autumn.

In **Basse Normandie** and **Pays de la Loire** (France) the vegetation curve for pastures remained above average levels from the beginning of the season. Some decrease in biomass production was experienced in mid-summer, with below the average level in the Loire, though a recovery can be observed towards the onset of autumn. As elsewhere, the end of the season shows a marked reduction in the level of biomass production.

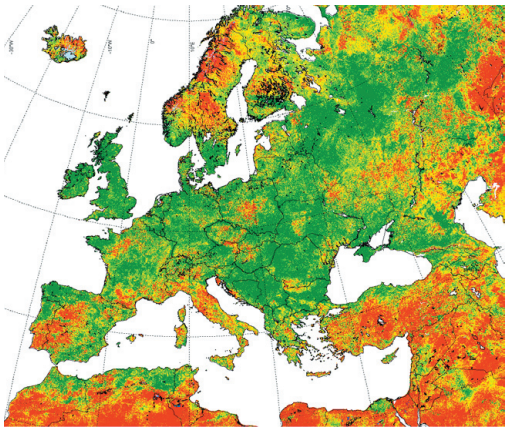
For **Extremadura** and **Castilla** y Leon (Spain), the profile of the vegetation curve for pastures remained above average from the beginning of the season. Following the normal pattern, a decrease in biomass production was experienced in mid-summer but, differently from the norm, at the beginning of autumn, instead of a recovery, the vegetation curve shows a decrease in biomass levels.

Zone 3 — South-eastern Europe: below average biomass levels at the beginning and recovery to normal levels during the rest of the season.

For **southern Germany and Austria,** winter and the beginning of the season was marked by a strong fall in the available biomass, as measured by the indicator. Following an established trend, however, the curves recovered in spring and the season continued with stable average levels.

In **central Italy,** as in most central and eastern Mediterranean areas, the beginning of the season was marked by a fall in the available biomass, as measured by the indicator, to below average levels. Following an established trend, however, the curves recovered in spring and the season continued at stable average levels.

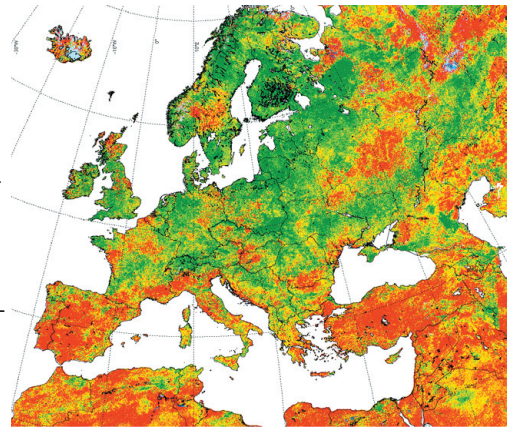
Spot-vegetation satellite analysis



SEPTEMBER 2004

Comparison of the vegetation index with the historical level of the same period (percentile)

00 - 20	LOWER POTENTIAL
20 - 40	
40 - 60	NORMAL
60 - 80	
80 -100	HIGHER POTENTIAL



OCTOBER 2004

Map highlights

The production vegetation maps compared the vegetation index of each period (dekad, month) with the historical values of the same period. It gives an indication the scale level of the ongoing NDVI value compared with the higher historical potential for the same period.

For the new campaign, the vegetation development shows a lower relative value in southern Europe, particularly from October. The vegetation cycle could have been delayed and the start of the season was suboptimal in these regions. In contrast, for most of the countries the vegetation development reached the maximum historical development, indicating an optimum biomass growth.

CNDVI profile highlights

Most European countries experienced a `very normal´ 2004 campaign with a good biomass production, as shown by the above vegetation indexes profiles.

A new crop season has started but most of the countries from central to northern Europe have a crop cover too low to be detected by low resolution sensor (NOAA and spot vegetation) particularly.

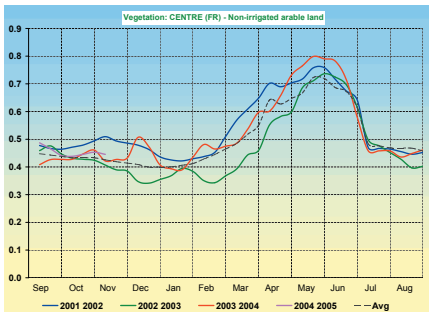
In southern Europe the crop cycle is quite advanced and shows a significant biomass production that can be analysed.

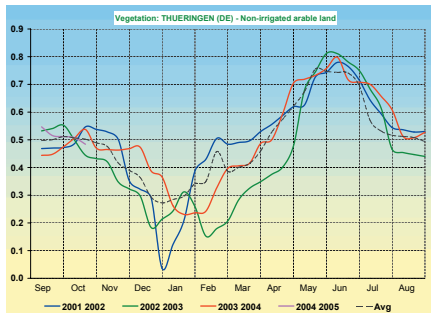
In Spain (Extremadura) and Portugal (Atlentejo), the crop development started with three weeks of delay compared with previous years. However, from the second dekad of October the crop development seems normal.

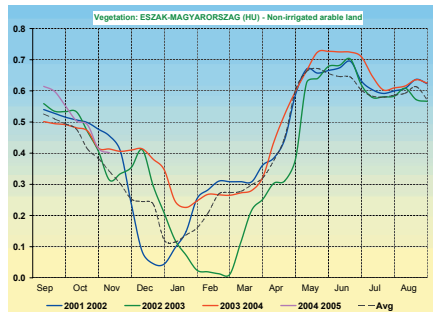
In Sardinia and Sicily - Italy - a new crop cycle has clearly started within the average time period. The profile shows a normal biomass development.

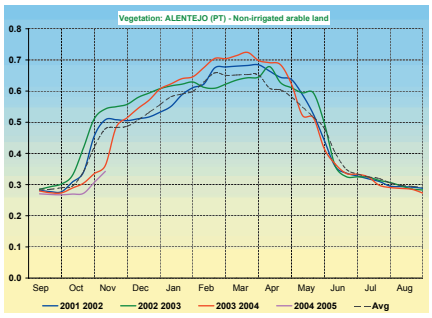
In Morocco and particularly in Tensif the vegetation index curve is delayed by three weeks compared to the average.

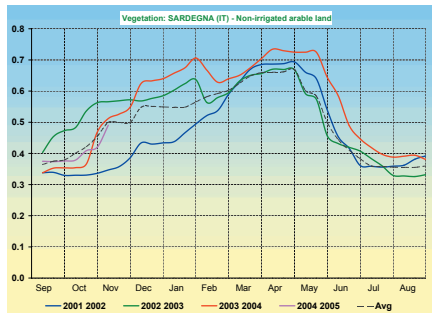
In Tunisia the crop profile shows an optimal growth.

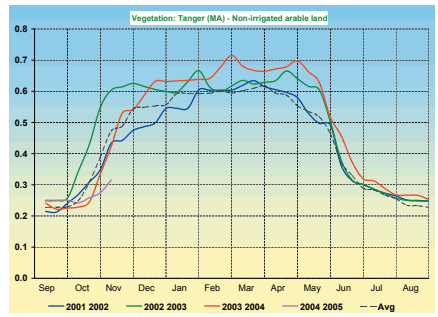


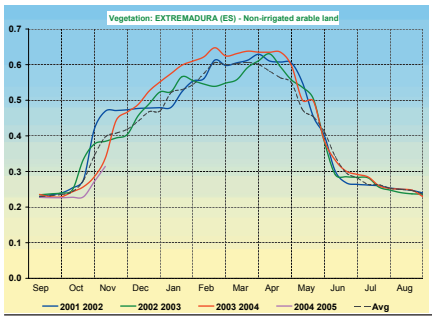


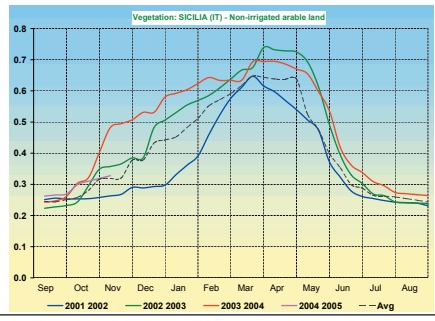


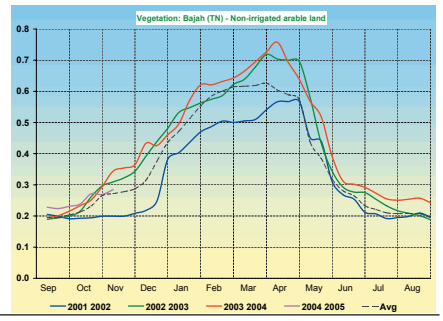












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