

High Yields of Winter Oilseed Rape in Germany 2004

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Based on the preliminary official estimation German farmers have harvested in summer 2004 about 5.21 million tons of rapeseed, which is the highest rapeseed production ever achieved in Germany. Compared to the much lower harvest of the year before, additional 1.66 million tons rapeseed are available. Increasing demand on rapeseed oil for food and non-food applications will allow the marketing of this huge production within the next months without any problems. Following an overview on the German rapeseed production results and techniques in 2004 is presented.

High acreage and record yields at harvest 2004

Since three years WOSR has been cultivated in Germany on a total acreage of about 1.3 million hectares. In summer 2003 UFOP has promoted to extend the acreage of WOSR for harvest 2004 as food and as non-food instead of set-aside. A lot of oilseed producers have followed this proposal and have made early contracts with good prices in spring 2004. Finally, due to severe drought conditions in summer 2003 many fields in south and south-west Germany were not sown with WOSR, therefore the potential for growing WOSR in Germany is no doubt about higher than 1.3 million hectares.

The huge production of harvest 2004 compared to 2003 is based on significant increase of yield per hectare (table 1). The average seed yield in Germany was 4.13 t/ha. This is an 24% increase compared to the average 1998 to 2003. In some regions (federal states) the yield was even higher, e.g. Mecklenburg-Vorpommern 4.52 t/ha; Schleswig-Holstein 4.42 t/ha, Sachsen 4.18 t/ha, Sachsen-Anhalt 4.17 t/ha, Brandenburg 4.15 t/ha; Niedersachsen 4.06 t/ha and Rheinland-Pfalz 4.04 t/ha; in all other regions the yield was higher than 3.50 t/ha.

Table 1: Production of Oilseed Rape in Germany 2003 and 2004 (source BMVEL October 2004)

	production area 1.000 ha		yield Ø t/ha		harvest 1.000 t	
	2003	2004	2003	2004	2003	2004
Baden-Württemberg	67.5	62.4	2.66	3.82	179.9	238.6
Bayern	163.5	136.2	2.38	3.86	388.4	526.0
Brandenburg	103.1	106.3	2.08	4.15	214.5	440.7
Hessen	55.4	55.1	2.88	3.52	159.6	194.2
Mecklenburg-Vorpommern	218.6	232.5	3.40	4.52	742.9	1050.7
Niedersachsen	85.1	100.1	3.17	4.06	269.7	406.3
Nordrhein-Westfalen	50.9	56.1	3.07	3.90	156.0	219.1
Rheinland-Pfalz	31.3	33.3	2.73	4.04	85.4	134.3
Saarland	3.2	3.0	2.15	3.53	6.9	10.5
Sachsen	117.2	117.5	2.61	4.18	305.9	491.1
Sachsen-Anhalt	118.8	137.8	3.01	4.17	358.1	574.7
Schleswig-Holstein	102.5	112.6	3.79	4.42	387.9	497.5
Thüringen	100.5	108.8	2.98	3.96	299.3	431.1
Germany total	1218.1	1261.7	2.92	4.13	3556.1	5214.6

Comparing the yields of WOSR from 1997 to 2004 (table 2) there is a significant positive trend of the rapeseed yields in Germany, despite the low yields in 2002 (due to very high rainfall) and 2003 (due to winter damage and drought).

Table 2: Seed Yield in t/ha of Oilseed Rape in Germany since 1997 (source BMVEL)

	1997	1998	1999	2000	2001	2002	2003	2004
Baden-Württemberg	3.10	3.46	3.42	3.43	3.51	3.21	2.66	3.82
Bayern	3.04	3.33	3.35	3.31	3.31	2.97	2.38	3.86
Brandenburg	2.57	3.04	3.32	2.57	3.38	2.62	2.08	4.15
Hessen	2.79	3.18	3.58	3.29	3.48	3.25	2.88	3.52
Mecklenburg-Vorpommern	3.52	3.84	4.05	3.88	4.18	3.22	3.40	4.52
Niedersachsen	3.05	3.14	3.52	3.15	3.60	2.72	3.17	4.06
Nordrhein-Westfalen	3.27	3.12	3.61	3.17	3.73	3.16	3.07	3.90
Rheinland-Pfalz	3.22	3.14	3.30	2.88	2.91	3.17	2.72	4.04
Saarland	3.19	3.19	3.08	2.38	2.32	3.02	2.15	3.53
Sachsen	3.22	3.42	3.48	3.24	3.52	2.84	2.61	4.18
Sachsen-Anhalt	3.12	3.30	3.68	3.10	3.61	2.79	3.01	4.17
Schleswig-Holstein	3.84	3.79	3.97	3.95	4.11	3.20	3.79	4.42
Thüringen	3.17	3.46	3.85	3.50	3.90	2.95	2.98	3.96
Germany total	3.22	3.43	3.63	3.37	3.69	2.99	2.92	4.13

Besides high average seed yields in 2004 very high yields on single farms resp. single fields have been harvested. Two examples:

- Rohwedder GbR, Pritzwalk (Brandenburg), soil classification: 43 BP
104 ha WOSR, average yield: 4.60 t/ha
highest yield: 6.20 t/ha on 50.0 ha (cv Titan)
- H.-J. Rienitz, Altentreptow (Mecklenburg-Vorpommern), soil classification: 42 BP
152.9 ha WOSR, average yield: 5.80 t/ha
highest yield: 6.23 t/ha on 19.8 ha (cv Titan)

At the DLG-fielddays (Dummerstorf, Mecklenburg-Vorpommern) there was an international comparison of different production techniques in WOSR. At these trials, carried out by support of UFOP, very high seed yields (plot yields) between 6.97 and 7.49 t/ha have been measured!

Modern rapeseed varieties and modern production techniques

The genetic yield potential of new WOSR varieties and their yield stability are the basis for high yields on farms. Based on datas of the official variety test of the Bundessortenamt several new WOSR varieties have been released during the last years. Both variety types – pure line varieties (OP/open pollinating varieties) and hybrid varieties (restored hybrids) are on the market. Seed yield and oil content are both important for the gross economic output of the WOSR production. Main objectives in WOSR breeding therefore are high seed yield and high oil content. Furtheron the quality of the rapeseed meal must be taken into account. Varieties above 18 μmol glucosinolate/g seed will not be tested in regional variety trials. During the last years there was significant genetic progress in seed yield, quality characters, disease resistance and standing power. This genetic progress is adopted by farmers very

quickly based on the fact, that almost 100% certified seed is used each year. Since several years hybrid varieties have been introduced into the market step by step (table 3). The market share of hybrids at harvest 2004 was about 50%. A lot of farmers have now experience with this variety type, nevertheless the market share of hybrids in northern parts of Germany is significantly higher compared to the southern parts of Germany. In the past hybrids had just average oil contents, whereas the new hybrid generation has high oil contents, which improves significantly the economics of their cultivation.

Table 3: Percentage of F1-Hybrid Varieties of Oilseed Rape in Germany since 1997
(source Rapool-Ring)

Year	total acreage 1.000 ha	hybrid varieties 1.000 ha	percentage of hybrids (%)
1996/97	858	28	3.3
1997/98	959	50	5.2
1998/99	1150	92	8.0
1999/00	1046	160	15.3
2000/01	1116	215	19.3
2001/02	1276	430	33.7
2002/03	1218	570	46.8
2003/04	1262	620	49.1

After choosing best regional adapted varieties the quality of the crop establishment in autumn is critical for a good harvest. Medium to heavy soils are more suitable for WOSR cultivation, in 2004 also light soils (e.g. in Brandenburg) got enough rainfall for very high yields. Sowing of WOSR should be done between August 10th and end of August depending on regional conditions. More vigorous and robust (e.g. hybrid) varieties allow to plant till September 10th, at late sowings the sowing density should be somewhat higher. The recommended sowing density is for the optimal sowing period 60-70 seeds/m² for OP-varieties, and 45-55 seeds/m² for F1-hybrids. All certified seed used in Germany are treated with insecticides against flea beetle and fungicides against early seedling diseases. For late sowing and for reduced tillage an additional seed treatment against *Peronospora* is common. A herbicide treatment before or early after emergence guarantees a good young seedling development. Treatments against grasses and volunteer cereals are carried out if necessary.

In many regions especially in North- and East-Germany a fungicide (triazol) treatment in autumn is generally applied in order to improve winter hardiness and/or to control phoma infections. Pests in autumn like flea beetle and slugs have to be checked and if necessary treated. A new pest in WOSR since a few years are larvae of the cabbage root fly (*Chortophila brassicae*), which is very difficult to control up to now, but due to favourable mild winter conditions in 2003/04 there was a good regeneration of the rapeseed root system. During spring before flowering it is usual to control the *Ceuthorrhynchus* stem weevils and blossom rape beetles based on results of catch control in yellow bowls; during flowering, pod mitges and pod weevils have to be taken into account. Fungicide treatments in early spring are quite common in order to control *Phoma lingam* and to improve standing power of the crop. At full flowering period in many regions it is common to spray fungicides against *Sclerotinia sclerotiorum*. New rapeseed varieties have quite high phoma resistance levels, but by now there are no resistances available against sclerotinia.

High yielding WOSR has a high demand on nitrogen and other nutrients. Rapeseed need about 6 kg N per 100 kg of seed harvested. The highest N demand is between early vegetation and flowering, in autumn it is usual to apply only a small amount of nitrogen. In early spring the first nitrogen application is about 60-70% of total nitrogen for good establishment of the leaf rosette and stem elongation of the main stem and side branching. The second N-application two to three weeks later is necessary for good development of side branches and for the later seed development. In total the N fertilisation in rape seed is up to 200 kg N per hectare or even more depending on N_{\min} soil content. Due to the fact that airborne sulphur pollution is less than 10 kg S/ha in Germany, it is very common to add 30-40 kg S/ha together with the first nitrogen application. Fertilising with micronutrients like boron will be taken into account, if necessary.

It can be summarized that German rapeseed farmers are running an intensive production scheme with crops of relative low plant densities, as basis of good and strong single plant development. Due to the economic output of WOSR for arable farms, this high intensity is recommended.

Climate in 2003/04 favours high seed yield

No doubt about the climate conditions during the vegetation year 2003/04 were favouring very high rapeseed yields. Although in the south and southwest of Germany many fields due to dry conditions in summer 2003 could not be sown as planned with WOSR, all other fields sown emerged quickly and even after rainfalls in early September 2003. Damages of the cabbage root fly in some regions made finally no problems due to mild winter conditions and these fields also had very high yields. There was no dry period in early summer which is typical in other years, therefore there was no reduction in number of pods, number of seeds/pod and seed weight resulting in high and very high seed yields per hectare at harvest 2004. The pressure of diseases like phoma, verticillium wilt, sclerotinia and different pests was relatively low during 2003/04.

Altogether, it can be summarized that the very high seed yield of WOSR in Germany 2004 were insured by good climatic conditions. Furtheron the great success is a result of using certified seed of elite varieties with efficient seed treatment, and a more or less intensive production technique adapted to local conditions. The German rapeseed production 2004 is a great achievement, which all partners in this business like agronomists, plant breeders, supervisors and farmers have to match in future.