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Winter Oilseed Rape (WOSR) resp. Winter Canola is the most important oil and protein crop on the European continent grown on an acreage of about 8.5 Million ha. After switching to 0-varieties mid of the 1970s and to 00-varieties mid/end of the 1980s F1-hybrid varieties were introduced progressively since mid of the 1990s. Today the market share of hybrids has reached above 85% of the cultivated area. The genetic gain in respect of on-farm yields and other characters will be analysed during the last three decades 1993 until 2022 mainly covering the period of introducing F1-hybrids.

Methods:

Based on national statistics reports of important WOSR countries like France, Germany, Poland, UK, Czech Republic and Denmark the trend of seed yields per hectare has been calculated. Data describing the quality like oil and protein content, and disease resistances have been taken from the official variety testing system. In addition, results from private trials were utilized.

Results:

In all growing areas the long-term trend during last three decades are showing a significant seed yield improvement between +0.15 to +0.50 dt per hectare and year. Part is caused by better agronomy, the greater part by improved genetics. But in many growing areas the on-farm yield trend since about 2010 (last decade) has reached a plateau (e.g. France), or is even negative (e.g. Germany, Czech Republic, UK). Positive yield trend during the last 10 years can be reported from Poland and Denmark.

Open pollinated varieties are still available mainly in Poland, UK and East Europe, nevertheless they have been outclassed by hybrid varieties. Genetic resistances against diseases like blackleg, light leaf spot, clubroot and TuYV have been improved significantly. New varieties have been selected for better nitrogen efficiency, producing the same seed yield with less nitrogen input.

Lower nitrogen input level as well as new genetics have raised the oil contents. On the other hand, seed protein contents are somewhat lower in younger varieties.

Conclusions:

Difficult agroclimatic conditions due to climate change like heavy rainfall, drought, heat, or late frost are more common during the last decade, which makes it more difficult to well establish a WOSR crop in autumn and to cultivate high yielding crops during spring and summer. Winter damage is in general of less relevance but can be important in North- and East-Europe, genetic differences in winter hardiness are significant.

New diseases like light leaf spot, clubroot or TuYV have limited the yield capacity and became new breeding objectives. Insect pests are getting much more severe and are more difficult to control. Political regulations (e.g. ban of neonicotinoid seed treatment) have had significant impacts.

Due to environmental reasons and political restrictions farmers in Europe had to reduce their nitrogen inputs, thus part of the genetic gain of better nitrogen use efficiency is gone into less N-inputs. An interesting situation can be recognized in Denmark, where the trend of yield improvement is strong linear also during the last decade. In this environment there are less abiotic and biotic stress factors and probably here the full genetic gain is realised on farm.