GCIRCBUL14*22

New Developments in Rapeseed Breeding U.K.

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Background

The area of winter rape sown in the UK in autumn 1996 is up considerably over previous years with a 27% increase in England compared with 1995. Plantings are estimated at over 350,000 hectares. Spring sowings are also likely to be higher in 1997. This is primarily due to the poorer prices being offered for spring barley (both feed and malting) and seed merchants are reporting a substantial increase in sales compared with the relatively low interest in spring rape over the last two years.

UK Varietal Recommendations for 1997

The composite hybrid Synergy again performed well overall in UK trials in 1996 and retaining its position as the UK's best performing variety where 3 or more years data is available. However, Synergy has exhibited considerable year-to-year and trial-to-trial variations drawing attention to the question of reliability of pollination. In 1994, the UK performance of Synergy was outstanding but the following two years were somewhat poorer. This has been attributed to the unusually frosty weather at flowering over large parts of the UK followed by very dry summer conditions. Pod set was conspicuously patchy on individual plants. However it is noteworthy that performance of Synergy in Scotland and the north of England has been far more consistent than in the south. This may be a consequence of several factors. Firstly, flowering is later and lasts for a longer period than in the south and the crop is likely to be free of long periods of frost. In addition, conditions for cross pollination may be more favourable as crops flower predominately during May in the north and insect activity will be far greater. Perhaps most important of all however is the greater reliability of rainfall in the north allowing full yield potential to be expressed.

Concern over the reliability of the pollination mechanism of these composite hybrids led to the setting up of a network of 17 trials across UK, France, Germany and Austria. These trials examined the performance of varietal associations in detail within field crops of varietal associations where background pollen levels would not be artificially high. Tagging of both hybrid and pollinator plants allowed assessment of survival rates and yield components, particularly seed set. Preliminary results indicated that seed set of hybrid plants is reduced in simulated field crop situations - possibly because of limited pollen availability. The concerns raised, namely that the current trialling system overestimates the performance of composites, has resulted in the UK testing authorities proposing to conduct separate trials for these varietal types in the future.

Added to the list of winter varieties provisionally recommended for 1997 are the restored hybrids Pronto and Artus. These varieties have completed two years of trialling across the UK and have performed similarly to Synergy but do not present the potential risk of inadequate pollen supply. These varieties have performed outstandingly in all parts of the UK and in a consistent manner in both 1995 and 1996.

For the first time, the 1997 OSR Recommended Lists contain a descriptive list for spring turnip rape. Spring sown rapeseed in general tends to be grown more widely in the north and the turnip types tend to progressively become more dominant as you move north in Scotland. Although these types have a lower yield potential they have considerable attributes for northern growers that more than make up. Firstly they are earlier maturing. In difficult late seasons this may make the difference between success and failure at harvest. They require lower inputs of nutrients, their later sowing may negate the requirement for a herbicide and the pod characteristics means that direct combining can be achieved with minimal seed loss even in later harvests. The much lower variable costs of growing the turnip rape tend to compensate for the lower potential yield when compared with swede types. When seed drying costs and rotational considerations (eg the earlier sowing of winter wheat after turnip rape) are taken into account then it is easy to see why the turnip rape is so successful in the north. Unfortunately the early maturity characteristic is not a positive attribute in all situations. On light soils or in the drier south, crops tend to run to seed when they

encounter moisture stress. In these situations, turnip rape crops can mature exceedingly early but produce miserable yields of exceptionally small seeds.

Genetically Enhanced Materials

In the UK, spring sown glufosinate ammonium hybrids have completed 2 years of National List trials. This varietal type has obtained UK consent to market but is awaiting clearance at a European level before commercialisation can take place. Glyphosate resistant material has also entered UK spring rape National List trials. With winter rape cultivars, both a glufosinate ammonium tolerant cultivar and a glyphosate tolerant cultivar have entered National List trials. Currently, National List trials for genetically enhanced material are all conducted in trials separate from the main NL trials of conventional material. An isolation distance of at least 50 metres from a neighbouring oilseed rape field is required for the constructs so far submitted. Calgene's high lauric rapeseed has completed four years of trialling in the UK. In 1996, small scale field production on a trial basis took place and this likely to be expanded in 1997.

Non food use of Rapeseed Meal

In 1995, the Home-Grown Cereals Authority in the UK funded a desk-based review of potential non-food uses for rapeseed meal. This work was prompted by a number of factors. Primarily there was concern that the Blair House agreement, which limits EU industrial rape seed production to 1 million tonnes of soya equivalent, might be exceeded. The use of the meal for non-food purposes would side-step this limit. In addition however, it was thought that the availability of non-food meal uses would allow 100% non-food use for certain high value transgenic rapeseeds which might ease the introduction of these types onto the UK market. Finally it was felt that such work was justified simply to assess the potential for wealth creation in this area.

The research group classified the potential uses into 3 main categories --- low value markets for simply disposing of the meal --- potential uses near term --- potential uses long term.

Low value markets: These markets simply allowed for disposal of the meal. These were potentially large markets but would only be options where there was an obligation to get rid of meal. These uses included uses as animal bedding (25% of current meal value) as a compost (25% of current meal value) and as a fuel for burning (50% of current meal value).

Near term markets were those which could be developed with minimal research and development work. None of the uses individually would utilise large quantities of meal but even so, the markets would be significant if simply a market for the excess over the Blair House limit was required. All these markets should achieve the current price for meal. They included specialist fertiliser, compost supplements, microbial culture media, low matrix wood composites and use as an absorbent material.

Long term markets were identified as those requiring considerable R&D to reach the market place but which were potentially large meal users and potentially high in value.

Most of these markets were based on the extraction of the protein and use depended on the protein's plasticity, strength, solvent and adhesive qualities. Uses identified included, biodegradable plastics, soluble and edible coatings, adhesives, coatings for paper, and textile and fibre applications.

As a commodity, the group felt that rapemeal had been under-utilised and under-investigated. This was largely because of the ready market that had been available in the feed industry and the lack of a UK organisation promoting the use and marketing of rapeseed meal. The report concluded that there were several options that offered real opportunities for wealth creation.