

Oilseed Rape Allergy : Fact or Fiction ?

C.G. HARKER and A. SOUTAR

Department of Environmental and Occupational Medicine, University of Aberdeen
Ashgrove Road West, Aberdeen, Scotland AB9 2ZD

K.C. WALKER and E.J. BOOTH

The Scottish Agricultural College, 581 King Street, Aberdeen, Scotland, AB9 1UD

Background

The area of oilseed rape grown in Scotland has increased dramatically from 120 hectares harvested in 1981 (Walker & Booth, 1992) to 60,000 ha harvested in 1992 (Anon 1992). Oilseed rape is now Scotland's most important non-cereal crop and occupies approximately 12% of the arable acreage. Parallel to this expansion, there have been growing claims in both Scotland and England of seasonal allergic symptoms such as headache, respiratory problems and eye irritation. Many individuals living in rural areas attribute these symptoms to oilseed rape and there has been much publicity in the media which has suggested that the crop should be banned from areas of high population in order to alleviate these problems. Winter oilseed rape cultivars flower from late April till early June whilst spring sown cultivars extend the period when crops are in flower through to early July. Consequently many local and UK national newspapers describe oilseed rape as 'the yellow peril' in their claims about the health problem they ascribe to the crop (Anon 1989).

The Survey

In order to investigate this apparently widespread problem an epidemiological survey was carried out in Grampian Region between October 1989 and September 1992 (Harker *et al* 1992). A cross-sectional questionnaire study of seasonal symptoms was carried out on random samples of 1000 individuals from a medical practice where little oilseed rape was grown and 1000 in total from 2 medical practices with a high density of oilseed rape in the locality. All individuals questioned were between the ages of 15 and 50 and were contacted by post to attend their clinic for interview. People unable to attend were visited, were interviewed by phone or returned their completed questionnaire by post. Questions were designed to assess the prevalence, and seasonality of symptoms. Interviews were conducted during the winter months (ie. when the presence of oilseed rape in the locality was not obvious) and no mention was made of oilseed rape in the survey questions to avoid prejudicing the outcome.

The Results

At the time of writing there has been an overall return of over 86% with all 3 survey areas producing similar return rates. The age structure, smoking prevalence and commuting profiles were also similar for all three areas.

Over 20% of the population complained of seasonal symptoms (Figure 1). There was a clear increase in prevalence of headache, wheeze, rhinitis, eye irritation and itchy skin in all three villages from May to August. These symptoms tended to be attributed to oilseed rape in the OSR villages and to other plants in the non-OSR village. The prevalence of eye symptoms and rhinitis did not differ between OSR and non-OSR villages whereas wheeze and itchy skin were more prevalent in one of the two OSR villages. Taking all seasonal symptoms together their

prevalence was higher in May in the OSR villages (Figure 1). Contrary to widespread belief in UK, there was no evidence of major differences in the prevalence of spring and summer symptoms between the two types of communities. It appears that the symptoms described are common, occurring in over 20% of both populations. Although this constitutes an important health problem for local doctors, oilseed rape is likely to be only one of several factors contributing to this. It is clear that OSR does not constitute a major health hazard and the cessation of oilseed rape growing in an area would be unlikely to result in a significant reduction in symptoms.

Future Work

Whilst alleviating fears that oilseed rape was a major cause of health problems in the community, occasionally individuals, including oilseed rape research workers who handle the crop, do become classically allergic. As a component of the study described detailed environmental sampling was conducted at the three villages and also around crops grown at the Scottish Agricultural College farm Tillycorthie, Aberdeenshire. A daily programme of air sampling was carried out using Burkard continuous pollen samplers during April May and June 1989-1991 (A Seaton, University of Aberdeen, personal communication, November 1992). Levels of pollen distant from fields was found to be generally very low and unlikely to cause sensitivity other than to those working with the crop who are exposed to high pollen concentrations for extended periods of time.

Similarly, although large numbers of fungal spores (which might conceivably cause allergic reaction) were detected, the ubiquitous nature of such spores during much of the year makes this an unlikely explanation for affecting those near the crop. Preliminary assessments of headspace vapour analysed by gas chromatography-mass spectrometry consistently revealed the presence of terpenes. Total terpenes were highest in the early season during the period of maximum plant growth rates and declined thereafter. Terpenes are known sensitizers and can cause skin and respiratory symptoms. This is an area of much interest and further more detailed research is being conducted at Aberdeen University on this topic. If terpenes were found to be the cause of symptoms in some people it is reassuring to note the great variation in terpene emission from different varieties (Tollstein and Bergstrom, 1988, Evans and Allen-Williams, 1992) suggesting that plant breeding could reduce the problem in the long term. Whilst reiterating that allergic reaction to oilseed rape is a relatively rare occurrence, it is also worth noting the very positive health benefits that oilseed rape oil consumption can confer on the community in terms of reduced cholesterol (Sallinen and Palmu, 1992).

Anon, 1992. Results of the 1992 agricultural census. Scottish office Agriculture and Fisheries Department, Edinburgh.

Anon, 1989. Allergy misery arrives early for victims of 'yellow peril'. Daily Mail 17 May 1989.

Evans, K. A. Allen-Williams L.J. 1992. Electroantennogram responses of the Cabbage Seed Weevil, *Ceutorhynchus assimilis*, to oilseed rape, *Brassica napus* ssp. *oleifera*, volatiles. J. Chem. Ecol. 18 (19) 1641-1659.

Harker, C.G., Soutar, A, Seaton, A, 1992. An epidemiological study of seasonal symptoms in a rural population. Proceedings of The British Thoracic Society in press.

Sallinen P, Palmu, T, 1992. In Finland consumers prefer rapeseed oil. GCIRC Bulletin No 8 93-97

Tollstein L., Bergstrom G. 1988. Headspace volatiles of whole plants and macerated plant parts of *Brassica* and *Sinapis* Phytochemistry 27 4013-4018.

Walker, K.C., Booth, E.J. 1992. Oilseed rape: its development and importance in Scotland. GCIRC Bulletin No 8 61-62.

Figure 1: Seasonal symptoms in OSR area and control area

