Herbicide Use in Scandinavia: Increased Cereal Yields, Improved Water Quality

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Cereal crops (wheat, oats, barley) make up the largest percentage of crop acres in Scandinavian countries (Sweden, Denmark, Norway, Finland). Herbicides are applied to 95-100% of cereal crop acres in Scandinavia every year [1][2].

Finland acquired herbicide products from England in 1946. The method developed slowly, and at the end of the 1950s only 12% of the cereal area was treated. A three-year National Weed Campaign was launched in 1962. The promotion of chemical control was the foremost objective. The Campaign proved successful and herbicide spraying was increased by 1965 to 44% of the total cereal acreage. By 1985 about 85% of cereal area was sprayed with herbicides [3].

Research with herbicides in cereals in Norway began in the late 1940s. By 1970, chemical weed control was practiced on 75-80% of the total cereal area. The resulting yield increase was estimated at 60,000 tons of grain annually [4]. In cereal trials conducted in Sweden from 1953-78, the yield increase following herbicide treatment was 200 kg/hectare [5]. By 1975, 75% of Sweden’s cereal acres were being sprayed with herbicides [6]. In Denmark, herbicides are regarded as "indispensable" in modern farming to sustain yield [7]. Their adoption in the 1950s-60s was well-timed as there was an urgent need to increase food production while at the same time there was a decline in farm labor for manually removing weeds.

All Scandinavian countries are signatories to the North Sea Treaty of 1987 which includes a goal of reducing nutrient inputs into the North Sea by half. Research showed that a considerable amount of phosphorus moves into waterways with eroded soil from fields that were plowed in autumn. In Norway, subsidies have been provided for switching from fall plowing to summer plowing or direct seeding with no plowing. Half of Norway's cereal acres are no longer plowed in the autumn. The reduction in erosion from switching from fall plowing is estimated at 85% [8]. Norway has determined that an absolute prerequisite for the success of these alternative tillage systems is that perennial weeds, as well as some winter-hardy annuals, are removed by spraying herbicides [9].

References