

CABBAGE APHID, *BREVICORYNE BRASSICAE* (L.), AS A PEST OF OILSEED RAPE CROPS.

M. KELM, H. GODOMSKI

Department of Agricultural Entomology, Agricultural University, Cybulskiego 32. 50-205 Wrocław, Poland.

ABSTRACT

The winter oilseed rape crop provides *B. brassicae* with suitable conditions for development of large colonies and the closeness of plants within the field enhances its dispersion. The maximum number of cabbage aphids on rape occurs in the second half of June. In our study, infested plants showed inhibition of growth and development. The seed yield loss ranged from 9 to 77%. Aphid feeding also caused an 11% reduction in seed oil content.

INTRODUCTION

The oligophagous aphid, *Brevicoryne brassicae* (L.) has been well recognized as a pest of cruciferous vegetables (Hafez, 1961) but data on its distribution and direct harmfulness to winter oilseed rape are still scarce. The big infestation by cabbage aphid and yield loss in rape was reported from Poland (Kelm, 1983) and mid-western and northern states of the USA (Hill, 1991). *B. brassicae* occurs in large numbers also on mustard, *Sinapis alba* L., a plant similar to rape (Gabrys, 1990). Bakhetia and Sekhon (1991) described high damage to rape by *Lipaphis erysimi* Kalt. which dominates on rape in India and, like *B. brassicae*, forms large colonies on stems in the final stage of rape vegetation.

EXPERIMENTAL

Materials and methods

The material for study was collected in 1991-1993 from the Agricultural University experimental field in Pawlowice near Wrocław, Poland. The aphid infestation was assessed weekly on 50 randomly chosen plants within 0.3 ha of an unprotected part of an oilseed rape field. Additionally, in the first days of July every year, 60 plants free of aphids (C) and aphid infested (IN) were selected and labelled. After harvest, these plants were collected and their morphology as well as quality and quantity of seed yield were evaluated. The oil content in seeds was measured using New Port Analyzer NMR and the statistical analysis was performed using the student t-test and regression analysis.

Infestation of oilseed rape by *B. brassicae*

B. brassicae was found in oilseed rape fields as soon as the seeds germinated. The autumn infestation ranged 10-96% in the years of study. The natural reduction

of overwintering eggs following plant deterioration due to frost and snow was very high, always reaching 50% (in some years 90%) of overwintering stages. The colonies founded by fundatrigeniae in spring occurred on 3-6% of plants. The infestation of plants was somewhat increased by winged aphids which flow from other habitats usually in the second half of May. Further dispersion within the field was due to walking migrations enhanced particularly by the closeness of plants. The maximum number of aphids on rape occurred in second half of June, 60-85% plants were infested and more than 10^3 aphids were found in the largest colonies. The high level of infestation was possible in colonies started by fundatrices and migrants. The relatively high (usually more than 50% of maximum number) number of aphids in the population was maintained until the vegetation ended. The aphids occurred on pods and pod shoots at that time.

Effect of *B. brassicae* feeding on growth and seed yield of oilseed rape

The plants infested by *B. brassicae* differed significantly from healthy plants in growth, root neck diameter and number of side shoots. The inhibition of growth, root neck development and side shoot formation reached 35, 23, and 43%, respectively. In 1993, the infested plants had twice as little pods as healthy plants and the seed yield loss was 77%. In two other years, the seed yield loss was 9-51%. The negative correlation coefficient for aphid cumulative index in studied colonies and seed yield was $r = 0.7513$ and the linear regression model was $y = 6.1992 - 0.0226x$. Apart from the yield loss, the decline in seed quality occurred. MTS was reduced by 37% on an average. The seeds from plants infested by aphids had 5.9% less oil and it was significantly different at $\alpha=0.95$. The total oil content was then reduced by 11%. It must be emphasised that aphids cause the most significant loss in oil content in seeds as compared to other insect pests which infest rape (Kelm, 1993).

REFERENCES

- Bakhetia, D.R.C. and Sekhon, B.S. (1991). Economic threshold of mustard aphid *Lipaphis erysimi* Kaltentbach. *Proc. of 8th International Rapeseed Congress*, 2, 502-505.
- Gabrys, B. (1990). Distribution of *Brevicoryne brassicae* and *Myzus persicae* on yellow mustard plant. *Proc. Conf. Insect Chem. Ecol.*, 303-305.
- Hafez, M. (1961). Seasonal fluctuations of population density of the cabbage aphid *Brevicoryne brassicae* L. in the Netherlands and the role of its parasite, *Aphidius diaeretiella rapae* (Curtis). *Tijdschr. Plantenziekten*, 67, 445-459.
- Hill, C.B. (1991). Pests and diseases attacking winter canola in the USA. *Proc. of 8th International Rapeseed Congress*, 6, 1673-1676.
- Kelm, M. (1983). O zagrożeniu plonow rzepaku ozimego i warzyw krzyzowych przez mszyce kapuszciana *Brevicoryne brassicae*. *Ochrona Roslin*, 9, 16-18.
- Kelm, M. (1993). *Sprawozdanie z pracy naukowo-badawczej*, 1-63.