

POPULATION OF TRUE BUGS (*HETEROPTERA*)
ON THE INFLORESCENCES OF QUINOA (*CHENOPODIUM QUINOA* WILLD.)

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Abstract: In the years 1999–2000 the studies on the population of true bugs colonizing the inflorescences of quinoa (*Chenopodium quinoa* Willd.) were conducted in Chrząstowo near Bydgoszcz. The dominating species was *Lygus rugulipennis* Popp. The species was recorded in 81.44% in 1999 and 83.64% in 2000 of all collected true bugs.

Key words: *Chenopodium quinoa* Willd., Quinoa, *Heteroptera*, *Miridae*, *Pentatomidae*, *Anthocoridae*, *Nabidae*, *Lygus rugulipennis* Popp.

I. INTRODUCTION

Quinoa or quinoa (*Chenopodium quinoa* Willd.) is not well known in Poland. However, it has a long and distinguished history in South America as a native plant to the Andes Mountains of Bolivia, Chile, and Peru (Podbielkowski 1966). This annual species is a highly nutritious food. It is rich in protein, unsaturated oils and is a source of calcium and iron, and essential amino acids. The quinoa's seeds do not contain gluten that makes this species very valuable for people with celiac disease. Quinoa is a high productive plant well adapted in our climate (Grochowski 1998).

The examinations of the inflorescences of quinoa have showed the wide spectrum of insect's colonization on this species. True bugs were the most often recorded and it was the main reason to undertake the studies on their population.

II. MATERIALS AND METHODS

The studies were carried out in the years 1999–2000 in the Experimental Station for Cultivar Testing in Chrząstowo. There were examined different cultivars of quinoa (*Chenopodium quinoa* Willd.) planted on experimental plots. Experiments were a complete randomized block designed with four replications. The research was performed on 96 plots. The cultivars varied in color of plants and seeds, and a type of the inflorescences. As the ex-

perimental plots were small and set up in close proximity, all cultivars were treated as one crop.

The insects were caught using the mean of shaking off pests (10 inflorescences from each plot) into bags that were put on the inflorescences. The samples were taken at 7 day-intervals during the blooming starting in August until September.

The quantity and quality analyses were done and the population of true bugs was defined. The true bugs were determined to the species using the key (Cmoluchowa 1978; Korcz 1994). The number and the percentage contents of determined species were scored.

III. RESULTS AND DISCUSSION

In the years 1999–2000 the total number of caught true bugs was 7,165 (Tab. 1). The quantity analyses showed the presence of pests from 4 families: *Miridae* (plant bugs), *Pentatomidae* (stink bugs), *Anthocoridae* (minute pirate bugs) and *Nabidae* (damsel bugs). The species from the family *Miridae* dominated in both years (3,986 and 3,087 individuals, respectively) i.e. 81.44% and 83.64% (Tab. 1).

The species *Lygus rugulipiennis* Popp. (European tarnished plant bug) was the most numerous occurring species in the both years (81.44% and 83.64% all collected true bugs, respectively (Tab. 1).

Lygocoris spinolai Mey D. was the second species the most often present in the caught population. 406 European tarnished plant bugs were collected in the year 1999 (10.06%) and 319 in the year 2000 (10.19%).

Another species from the true bug family – *Orthops campestris* L. occurred much less abundantly and its density reached 4.09% (165 individuals) in 1999 and 1.47% (46 individuals).

The number of the other true bugs from *Miridae* family ranged from 0 to 1.64%.

From the family *Pentatomidae* (stink bugs) only 2 individuals (0.05%) were collected in 1999. Both bugs were diagnosed as *Palomena prasina* L. In 2000 there was no specimens from this family caught.

The species from the two predator families were also collected. *Orius niger* Wff. and *Nabis pseudoferus* Rm. were caught in the both years of survey (79 and 11 individuals, respectively). The number of *Orius niger* Wff. amounted to 1.07% all analyzed fauna of true bugs in 1999 and 1.15% in 2000. *Nabis pseudoferus* Rm. was less numerous (0.12% and 0.19%, respectively).

The conclusion from the conducted studies is that *Lygus rugulipiennis* Popp. has represented *Lygus* spp. the most abundantly. It is the typical poliphage species of arable crops and simultaneously very expansive (Korcz 1987). In Poland *Lygus rugulipiennis* Popp. often constitutes 90–100% of all pests from *Lygus* spp. (Bilewicz-Pawińska 1970). Holopainen and Varis (1991) have demonstrated that *Lygus rugulipiennis* Popp can infest about 500 host plants.

There has been no evidence in Polish literature about harmfulness to quinoa plants induced by true bugs. However, its abundant presence has been recorded on other crops, such

Table

Heteroptero fauna collected from inflorescences of quinoa at Chrzęstkowo *Chemopodium quinoa* Willd. In the years 1999–2000

No.	Family Species	1999		2000	
		Total	%	Total	%
I	<i>Miridae</i>	3,986	98.76	3,087	98.66
	1. <i>Lygus rugulipennis</i> Popp.	3,287	81.44	2,617	83.64
	2. <i>Lygus gemellatus</i> H.S	42	1.04	13	0.42
	3. <i>Lygus punctatus</i> Zett.	66	1.64	17	0.54
	4. <i>Lygus pratensis</i> L.	6	0.15	35	1.12
	5. <i>Lygus wagneri</i> Rem.	3	0.07	5	0.16
	6. <i>Orthops campestris</i> L.	165	4.09	46	1.47
	7. <i>Orthops kalmi</i> L.	3	0.07	9	0.29
	8. <i>Orthops basalis</i> Costa	0	0.00	16	0.51
	9. <i>Lygocoris spinolai</i> Mey D	406	10.06	319	10.19
10. <i>Lygocoris lucorum</i> Mey D L.	8	0.20	10	0.32	
II	<i>Pentatomidae</i>	2	0.05	0	0
1. <i>Palomena prasina</i> L.	2	0.05	0	0.00	
III	<i>Anthocoridae</i>	43	1.07	36	1.15
1. <i>Orius niger</i> Wff.	43	1.07	36	1.15	
IV	<i>Nabidae</i>	5	0.12	6	0.19
1. <i>Nabis pseudoferus</i> Rm.	5	0.12	6	0.19	
Total		7,165			

as onions, carrots and cucumbers (Korczyński 1987), bean (Szwejdka 1978; Korczyński 1987), ornamental plants (Burdajewicz 1988, 1989; Baranowski 1976), parsley (Korczyński 1976), beets (Bilewicz-Pawińska 1970), asparagus (Wilkaniec 1996) and faba bean (Paradowska 2000) and many other plants.

Cranshaw et al. (1990) conducted studies on the entomofauna of quinoa in Colorado. They determined insects from 7 orders. The species from 4 families (2 predator families) belonging to true bugs were represented. From the family *Miridae* there were present *Malanotrichus coagulatus* Uhler, *Atomoscelis modestus* Van Duzee and *Deraeocoris nebulosus* Uhler, from the family *Lygaeidae* – *Nysius raphanus* Howard, from *Nabidae* family – *Nabis alternatus* Parchley and from *Anthocoridae* family – *Orius tristicolor*.

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V. POLISH SUMMARY

PLUSKWIAKI RÓŻNOSKRZYDŁE WYSTĘPUJĄCE W KWIATOSTANACH KOMOSY RYŻOWEJ – *CHENOPODIUM QUINOA* WILLD.

Badania przeprowadzono w latach 1999–2000 na uprawie komosy ryżowej *Chenopodium quinoa* Willd.

Celem pracy było poznanie heteropterofauny zasiedlającej kwiatostany tej rośliny.

Spośród pluskwiaków roślinożernych gatunkiem dominującym był zmienik lucernowiec – *Lygus rugulipennis* Popp. Stanowił on w 1999 roku 81,44%, a w 2000 roku 83,64% wszystkich zebranych pluskwiaków. Drugim najliczniej występującym gatunkiem był zmienik zielonek – *Lygocoris spinolai* MeyD (10,06–10,19%).

W zebranych materiale oznaczono również dwa gatunki pluskwiaków drapieżnych – *Orius niger* Wff. I *Nabis pseudoferus* Rm.