

OCCURRENCE OF ERIOPHYOIDS (ACARI: ERIOPHYOIDEA)  
ON WILD AND CULTIVATED GRASSES

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**Abstract:** In the years 1999–2000 the occurrence of eriophyoids on grasses was studied in the Wielkopolska region. 9 eriophyoid species were recognized on 29 grass species. Eriophyoids were present in 38% examined plant samples. The most often infested were *Agropyron repens* and *Lolium perenne* and the least *Arrhenatherum elatius*. *Abacarus hystrix* and *Aculodes mckenziei* were the dominating eriophyoid species. The intensity of occurrence varied and was related to the eriophyoid species and the host plant. Feeding of some eriophyoids species caused either matting or browning or twisting of the leaf blades.

**Key words:** eriophyoid mites, grasses, intensity of occurrence

I. INTRODUCTION

Eriophyoid mites (*Eriophyoidea*) occurring on grasses are the minor pests causing significant losses in both pasture and seed grasses and also in cereals (Amrine and Stasny 1994; Frost and Ridland 1996; Oldfield and Proeseler 1996). The eriophyoids colonize both wild and cultivated grasses. Besides, they inhabit many other plant species and within the progress in research the list of host plants extends (Davis et al. 1982; Amrine and Stasny 1994).

The grass mites occurring commonly in Eurasia, North America and New Zealand cause economically losses through direct physical damages. Nevertheless the main injuries result from the transmission of fungal, bacteria and virus plant diseases. The symptoms of their feeding varied. The leaf discoloration, the twisting and the rolling leaf edges and plant tips, shortening of stems and internodes, witches' broom appearance and plant sterility can be observed (Davis et al. 1982; Amrine and Stasny 1994).

Recently, in Poland the extensive studies on the eriophyoid mites colonizing grasslands have been undertaken (Boczek et al. 2000; Kozłowski 2000; Skoracka 2000; Skoracka and Boczek 2000). The main goal of conducted studies was to determine the eriophyoid fauna and their host plants.

This paper presents the results from studies on the occurrence of some the eriophyoid species on the wild and the cultivated grasses and the impact of their feeding on health conditions of plants.

## II. MATERIAL AND METHODS

The studies were carried out in the climatic subregion of Wielkopolska in the years 1999 and 2000. The sampling was done on the wild grasses from barren land and on the cultivated grasses in the experimental trials conducted in Plant Breeding Stations (Leszno, Marchwacz, Nowa Wieś Ujska, Szelejewo, Śrem, Winna Góra) and also in Research Centers for Cultivar Testing (Lubieniecko, Słupia Wielka). Totally 460 plant samples were collected from 40 grass species. 10 samples were taken from each wild and cultivated species (5 plants in each sample). The plants were inspected under a stereomicroscope and the following features were determined: the number of eriophyoids, the place of mite colonization on plant and the level of plant injuries. The eriophyoid mites were removed from plants and immersed in permanent slides according to Keifer's method (Keifer 1952) and after that the species were determined (Keifer 1944; 1952; Proeseler 1972; Jeppson et al. 1975; Amrine 1997; Sukhareva 1977). In addition the intensity of occurrence, the density of mites and the percentage content were calculated for each grass species.

## III. RESULTS

The eriophyoid mites (*Acari: Eriophyoidea*) were recorded on 29 grass species (*Gramineae*) of 40 collected from the climatic subregion of Wielkopolska. There were found 9 eriophyoid species and 6 of them were determined to the species, 2 to *Aceria* spp. and 1 to *Eriophyes* sp.

The recorded eriophyoid species are as follows:

### ***Abacarus compactus* Sukhareva, 1977**

*A. compactus* occurred on 5 grass species (Tabs. 1a and 1b) in 6 samples from 3 sites (Dolsk, Marchwacz and Śrem). It was mostly found on the upper leaf blade in grooves between veins. The number of this species was less than 1 specimen per cm<sup>2</sup> of leaf area. Its feeding did not cause visible symptoms on plants. *A. compactus* was present in two and three species populations with *A. hystrix*, *A. mckenziei* or *A. tosichella*. It occurred alone only in one sample from *Festuca pratensis*.

Previously it has been recorded on *Festuca ovina* L. in Russia (Sukhareva 1977).

### ***Abacarus hystrix* (Nalepa 1896)**

*A. hystrix* was present on 23 grass species (Tabs. 1a and 1b) in 114 samples from 37 sites. It was often observed at the base of leaves and usually on the upper leaf surface. *A. hystrix* colonized leaves on *Apera spica-venti* but single specimens were also found in inflorescence. However, Skoracka (2000) and Nault and Styer (1969) in their studies have not recorded this species occurrence in the inflorescences and the leaf sheaths.

The most often colonized grass species were *Agrostis vulgaris*, *Apera spica-venti*, *Phleum pratense* and *Agropyron repens*. The number of *A. hystrix* on some plants such as *A. repens* and *P. pratense* was 12 mites per cm<sup>2</sup> of leaf area. *A. hystrix* was often observed in mixed populations with *A. mckenziei* (40 samples from 17 grass species). Also Guy and Gould (1996) and Frost and Ridland (1996) have observed common colonization of those

two species. *A. hystrix* was also often found in one species populations (36 samples from 9 grass species). It was present on the same leaves with *A. dubius* and *A. mckenziei* or only with *A. dubius*. The results revealed that *A. hystrix* was the only species recorded on *Hordeum murinum*, *Phalaris arundinacea* and *Poa angustifolia*. Heavily infested grass species (more than 5 mites per cm<sup>2</sup> of leaf area) had a mat appearance or bronzed discoloration. Other symptom of *A. hystrix* colonization like the retardation of grass earing as the result of eriophyoid feeding (Boczek 1999) was not recorded.

*Abacarus hystrix* is a common pest throughout Eurasia and North America, Africa, Australia and New Zealand. It has been found on over 40 grass species (Nalepa 1896; Proeseler 1972; Gibson 1974; Sukhareva 1981; Amrine and Stasny 1994). In Poland *A. hystrix* has been recorded from 40 grass species (Boczek 1969; Boczek et al. 1976; 2000; Kozłowski 2000; Skoracka 2000; Skoracka and Boczek 2000; Skoracka, personal information). The conducted studies have indicated 8 grass species colonized by this eriophyoid mite (Tabs. 1a and 1b). Presently 48 grass species are known as the host plants of *A. hystrix*. Probably this number is much higher.

#### ***Aceria tenuis* (Nalepa 1891)**

The occurrence of *Aceria tenuis* was recorded in 4 samples from 4 grass species (Tabs. 1a and 1b). It colonized the upper leaf blade. The number of this species was less than 1 specimen per cm<sup>2</sup> of leaf area. This mite occurred in one species populations on plants of *Dactylis glomerata* and *Festuca arundinacea*. It was present in mixed populations with *A. hystrix* on *Poa pratensis* and also with *A. mckenziei* on *Festuca pratensis*.

This species has been recorded from 45 plant species in North America and Europe (Nalepa 1891; Davis et al. 1982; Amrine and Stasny 1994). In Poland *A. tenuis* has been found on *Agropyron repens*, *Brachypodium pinnatum* and *Bromus inermis* (Boczek et al. 1976) and also on *Triticum aestivum* (Kozłowski 2000). Presently in addition it was recorded from 4 other grass species (Tabs. 1a and 1b).

#### ***Aceria tosichella* Keifer, 1969 (syn. *Aceria tritici* Shevchenko et al. 1970)**

This species occurred on 13 grass species (Tabs. 1a and 1b) in 44 plant samples collected from 29 sites. It mostly inhabited the upper leaf blade. The most numerous occurrence of *A. tosichella* on *Dactylis glomerata* and *Poa pratensis* was observed on the leaf sheaths, at the base of leaves and under the ligule. Skoracka (2000) has described its occurrence on *A. elatius*, *A. repens*, *B. inermis* and *D. glomerata* mostly on the leaf sheaths.

*Bromus inermis*, *Trisetum flavescens* and *Agropyron repens* were the most colonized. The number of *A. tosichella* was as high as 4.5 mites per cm<sup>2</sup> of leaf area on *A. repens* and 7 mites per cm<sup>2</sup> of leaf area on *B. inermis*. Its intensity on the other species ranged from 0.1 to 3 mites per cm<sup>2</sup> of leaf area. There has not been observed the injuries caused by this species. *A. tosichella* usually occurred alone on leaves (16 samples from 4 grass species) or in company of *A. mckenziei* (11 samples from 6 grass species). In few samples it was present with other eriophyoid mites, i.e. one or two species.

For the first time *Aceria tosichella* was recorded on *Triticum sativa* in Yugoslavia (Keifer 1969). At the same time it was found on wheat and 4 other grass species in Uzbekistan and determined as *Aceria tritici* (synonym *A. tosichella*) (Schevchenko et al. 1970). In Poland this species was primary found on *Triticum aestivum* (Jeżewska and

Wieczorek 1998; Kozłowski 2000). Latter its occurrence was recorded also on *Agropyron repens*, *Festuca rubra* and *Millium effusum* (Skoracka and Boczek 2000) and 9 other grass species (Skoracka, personal information). The carried out studies have showed the presence of *A. tosichella* on 9 next grass species. The total number of the host plants in Poland is presently 22 species.

#### ***Aceria* spp.**

The occurrence of 2 eriophyoid mites from *Aceria* spp. was recorded on the following grass species: *Alopecurus pratensis*, *Festuca pratensis* and *Lolium perenne* (Tabs. 1a and 1b). They colonized the upper leaf blade at low intensity i.e. 1 individual per cm<sup>2</sup> of leaf area. Only in one sample from *A. pratensis* the mite from *Aceria* spp. was found in one species population at intensity of about 2 mites per cm<sup>2</sup> of leaf area. Theses two species from *Aceria* spp. were observed in populations with other species in other samples and also on *F. pratensis* and *L. perenne* plants.

#### ***Aculodes dubius* (Nalepa, 1891)**

*Aculodes dubius* occurred on 10 grass species (Tabs. 1a and 1b) in 36 samples from 18 sites. It inhabited the upper and the underside leaf blade, though more numerously the upper surface. The most numerical abundance of *A. dubius* was found on leaves and shoots covered with short hairs, on wild growing plants of *Bromus mollis* (up to 45 mites per cm<sup>2</sup> of leaf area). The average intensity of occurrence of this species on *B. mollis* was 18.6 mites per cm<sup>2</sup> of leaf area (Tab. 1a). *A. dubius* was also recorded on grass ears (about 100 mites in 1 ear). According to Skoracka (2000) this eriophyoid mite has often colonized the edges of leaves and the ligule of *B. mollis*. Additionally, Amrine and Stasny (1994) have frequently recorded *A. dubius* in the inflorescences of other plants. Some other findings have revealed the presence of *A. dubius* only on the youngest unfolded leaves (Nault and Styer 1969; Skoracka 2000). Nevertheless the conducted observations have showed its abundant feeding also on older leaves.

Furthermore, *A. dubius* inhabited numerously the leaves of *Festuca rubra* (up to 14 mites per cm<sup>2</sup> of leaf area). Less abundance of its occurrence was found on 8 other grass species (from 1 to 4 mites per cm<sup>2</sup> of leaf area). This species often colonized the same leaves in mixed populations with *A. hystrix*, *A. mckenziei* and *A. tosichella*. On the most often colonized plants (*Alopecurus pratensis*, *B. mollis* and *F. rubra*) its feeding caused twisting of leaf edges. Skoracka (2000) has observed similar injuries on *Phleum pratense*.

*Aculodes dubius* is known to be widely distributed in Europe (Austria, Bulgaria, Yugoslavia, Germany, Hungary and Russia) and in North America on 21 grass species (Nalepa 1891; Proeseler 1972; Sukhareva 1981; Amrine and Stasny 1994). So far in Poland it has been observed on 18 species (Boczek et al. 1976; Skoracka and Boczek 2000; Skoracka, personal information). The examined samples in our studies revealed the presence of *A. dubius* on next 3 grass species: *Bromus inermis*, *B. racemosus* and *Poa trivialis* (Tabs. 1a and 1b).

#### ***Aculodes mckenziei* (Keifer, 1944)**

This eriophyoid mite occurred on 23 grass species in 78 plant samples collected from 31 sites (Tabs. 1a and 1b). It mostly colonized the upper leaf surface. *A. mckenziei* inhabited grooves along veins and in the leaf sheaths. The leaf sheaths were the main occupied spots on *Bromus erectus* plants. On the contrary on *Bromus inermis* it colonized the leaf tips.

Skoracka (2000) has observed that *A. mckenziei* occurs mostly on the top leaves of *B. inermis* and colonize the youngest leaves only during the absence of inflorescences. When the inflorescences develop the mites move toward them.

*A. mckenziei* the most often inhabited plants of *Festuca rubra*, *Dactylis glomerata* (10 mites per cm<sup>2</sup> of leaf area) and *Agropyron repens* (8 mites per cm<sup>2</sup> of leaf area) and less frequently *Trisetum flavescens* and *Poa trivialis* (4–7 mites per cm<sup>2</sup> of leaf area). The average intensity was the highest on *F. ovina*, *F. rubra* (cultivated grasses, Tab. 1b) and *T. flavescens* (wild grasses, Tab. 1a). There was observed a slight browning of the leaf tips on *F. rubra* and *T. flavescens* plants. No injuries were recorded on other grass species. This mite species colonized the same leaves with *A. hystrix*. It rarely occurred alone (11 samples from 10 grass species) and with the company of *A. dubius* (8 samples from 6 grass species) or with *A. tosichella* (10 samples from 6 grass species). It was found in 8 samples from 4 grass species in mixed populations with *A. dubius* and *A. hystrix*. *A. mckenziei* was the only eriophyoid mite species recorded on *Festuca ovina*.

*Aculodes mckenziei* occurs in Europe, North America and Australia mostly on *L. multiflorum* and *L. perenne* (Guy and Gould 1996). Until now it has been recorded on 14 grass species in the world and in Poland (Keifer 1944; Proeseler 1972; Boczek et al. 1976; Skoracka and Boczek 200; Skoracka, personal information). In the present studies its occurrence of next 14 grass species has been recorded. The total number of the host plants is 28 grass species.

#### IV. CONCLUSIONS

The eriophyoid mites were recorded in 37.6% examined samples. The mean percentage of wild grasses infested by mites was 35.7% and cultivated grasses 38.5%. Meanwhile the mean frequency of inhabited samples was 50.0% and 52.0%, respectively (Tab. 3).

For wild grasses the most often colonized species were from *Agropyron repens* (91% samples) and the least *Arrhenatherum elatius* (8% samples). For cultivated grasses the highest percentage of infested plants was for *Lolium perenne* (82%), *Festuca pratensis* (79%) and the lowest for *Festulolium braunii* (20%) (Tab. 3).

The most often recorded mite species were *Abacarus hystrix* and *Aculodes mckenziei*. On some grass species other eriophyoid mites were present as well. The most often found was *Aculodes dubius* (Tabs. 1a and 1b). *A. hystrix* was the dominating species on 10 grass species while *A. mckenziei* on 4 species. On plants of *Bromus sterilis* the dominating species was *A. dubius* (Tabs. 2a and 2b).

All recorded in the study the eriophyoid mite species occurred on the upper leaf blade and mostly in the grooves between veins. They also preferred the upper leaf blade on grasses having glabrous leaves such as: *Dactylis glomerata*, *Festuca arudinacea* and *Lolium multiflorum*. Congregation on the upper leaf surface is important for further translocation. The mites can be easily picked up by wind currents and carried to their other grass hosts. *A. dubius* and *A. hystrix* were found also on the underside leaf surface. *A. mckenziei* and *A. tosichella* were observed in the leaf sheaths and under the ligule and the

Table 1a

Intensity of occurrence of eriophyoids on wild grasses (average number of mites per 1 cm<sup>2</sup> leaf)

Host plants	<i>A. compactus</i>	<i>A. hystrix</i>	<i>A. tenuis</i>	<i>A. tosichella</i>	<i>Aceria</i> spp.	<i>A. mckenziei</i>	<i>A. dubius</i>
<i>Agropyron repens</i> (L.) P.B.	0	3.28	0	2.44	0	2.24	1.33
<i>Agrostis vulgaris</i> With.	0	5.61	0	0	0	0.73	0
<i>Alopecurus pratensis</i> L.	0	0.43	0	0.35	1.05	0.79	1.82
<i>Apera spica-venti</i> (L.) P.B.	0	4.40	0	0	0	1.20	0
<i>Arrhenatherum elatius</i> (L.) P.B.	0	0.43	0	0	0	0.89	0
<i>Avenastrum pratense</i> (L.) Opiz.	0	0.82	0	0.43	0	0	0
<i>Bromus erectus</i> Huds.	0	0	0	0.40	0	1.08	0
<i>Bromus inermis</i> Leyss.	0	1.66	0	4.01	0	1.16	1.83
<i>Bromus mollis</i> L.	0.61	0	0	0.84	0	0.55	18.6
<i>Bromus racemosus</i> Huds.	0	0.48	0	0	0	1.10	3.9
<i>Bromus sterilis</i> L.	0	0	0	0.19	0	0	0.56
<i>Bromus tectorum</i> L.	0	0.18	0	0	0	0.44	0
<i>Dactylis glomerata</i> L.	0	2.36	0.99	0.86	0	2.13	0
<i>Festuca pratensis</i> Huds.	0	0.49	0	0	0	0	0
<i>Festuca rubra</i> L.	0	0	0	0	0	1.31	0
<i>Hordeum murinum</i> L.	0	1.23	0	0	0	0	0
<i>Lolium perenne</i> L.	0	3.47	0	0	0.98	0.48	1.39
<i>Phalaris arundinacea</i> L.	0	0.99	0	0	0	0	0
<i>Phleum pratense</i> L.	0	0.11	0	0.22	0	0.28	1.75
<i>Poa angustifolia</i> L.	0	1.60	0	0	0	0	0
<i>Poa pratensis</i> L.	0	0.68	0.23	0.62	0	0	0
<i>Poa trivialis</i> L.	0	0	0	0	0	3.17	3.44
<i>Trisetum flavescens</i> (L.) P.B.	0	0	0	2.96	0	4.19	0

Table 1b

Intensity of occurrence of eriophyoids on cultivated grasses (average number of mites per 1 cm<sup>2</sup> leaf)

Host plants	<i>A. compactus</i>	<i>A. hystrix</i>	<i>A. tenuis</i>	<i>A. tosichella</i>	<i>Aceria</i> spp.	<i>A. mckenziei</i>	<i>A. dubius</i>
<i>Arrhenatherum eliatius</i> (L.) P.B.	0	0.86	0	0	0	1.80	0
<i>Bromus inermis</i> Leyss.	0	0.47	0	0	0	0.53	0
<i>Dactylis glomerata</i> L.	0	0	0	0.74	0	0	0
<i>Festuca arundinacea</i> Schreb.	0	0.31	0.64	1.29	0	0.40	0
<i>Festuca ovina</i> L.	0	0	0	0	0	4.70	0
<i>Festuca pratensis</i> Huds.	1.0	2.11	0.27	0	0.67	0.31	0
<i>Festuca rubra</i> L.	0.41	2.30	0	0	0	4.16	4.25
<i>Festulolium braunii</i> Richt.	0	1.41	0	0	0	0.90	0
<i>Lolium multiflorum</i> Lam.	0	0.32	0	0	0	0.16	0
<i>Lolium x boucheanum</i> Kunch.	0.06	0.97	0	0	0	0.06	0
<i>Lolium perenne</i> L.	0.67	1.90	0	0	0.36	0.43	0.65
<i>Phleum pratense</i> L.	0	0.47	0	0.27	0	0.19	0.19
<i>Triticum aestivum</i> L.	0	0.76	0	0.42	0	0.1	0

Table 2a

## Percentage contents of eriophyoid species on wild grasses

Host plants	<i>A. compactus</i>	<i>A. hystrix</i>	<i>A. tenuis</i>	<i>A. tosichella</i>	<i>Aceria</i> spp.	<i>A. mckenziei</i>	<i>A. dubius</i>
<i>Agropyron repens</i> (L.) P.B.	0	45.2	0	13.9	0	29.2	11.7
<i>Agrostis vulgaris</i> With.	0	95.0	0	0	0	5.0	0
<i>Alopecurus pratensis</i> L.	0	27.0	0	7.5	13.4	23.2	28.9
<i>Apera spica-venti</i> (L.) P.B.	0	82.2	0	0	0	17.8	0
<i>Arrhenatherum elatius</i> (L.) P.B.	0	16.6	0	0	0	83.4	0
<i>Avenastrum pratense</i> (L.) Opiz.	0	34.8	0	65.2	0	0	0
<i>Bromus erectus</i> Huds.	0	0	0	50.0	0	50.0	0
<i>Bromus inermis</i> Leyss.	0	34.3	0	39.2	0	22.2	4.3
<i>Bromus mollis</i> L.	6.9	0	0	54.7	0	16.2	22.2
<i>Bromus racemosus</i> Huds.	0	11.1	0	0	0	63.8	25.1

Host plants	<i>A. compactus</i>	<i>A. hystrix</i>	<i>A. tenuis</i>	<i>A. tosichella</i>	<i>Aceria</i> spp.	<i>A. mckenziei</i>	<i>A. dubius</i>
<i>Bromus sterilis</i> L.	0	0	0	26.1	0	0	73.9
<i>Bromus tectorum</i> L.	0	37.5	0	0	0	62.5	0
<i>Dactylis glomerata</i> L.	0	14.9	5.3	51.8	0	28.0	0
<i>Festuca pratensis</i> Huds.	0	100.0	0	0	0	0	0
<i>Festuca rubra</i> L.	0	100.0	0	0	0	0	0
<i>Hordeum murinum</i> L.	0	100.0	0	0	0	0	0
<i>Lolium perenne</i> L.	0	68.5	0	0	4.8	7.1	19.6
<i>Phalaris arundinacea</i> L.	0	100.0	0	0	0	0	0
<i>Phleum pratense</i> L.	0	1.0	0	6.0	0	15.0	78.0
<i>Poa angustifolia</i> L.	0	100.0	0	0	0	0	0
<i>Poa pratensis</i> L.	0	30.0	3.3	66.7	0	0	0
<i>Poa trivialis</i> L.	0	0	0	0	0	85.7	14.3
<i>Trisetum flavescens</i> (L.) P.B.	0	0	0	25.5	0	74.5	0

Table 2b

## Percentage contents of eriophyoid species on cultivated grasses

Host plants	<i>A. compactus</i>	<i>A. hystrix</i>	<i>A. tenuis</i>	<i>A. tosichella</i>	<i>Aceria</i> spp.	<i>A. mckenziei</i>	<i>A. dubius</i>
<i>Arrhenatherum elatius</i> (L.) P.B.	0	33.3	0	0	0	66.7	0
<i>Bromus inermis</i> Leyss.	0	50.0	0	0	0	50.0	0
<i>Dactylis glomerata</i> L.	0	0	0	100.0	0	0	0
<i>Festuca arundinacea</i> Schreb.	0	28.7	25.0	16.7	0	29.6	0
<i>Festuca ovina</i> L.	0	0	0	0	0	100.0	0
<i>Festuca pratensis</i> Huds.	10.0	83.0	0.6	0	1.6	4.8	0
<i>Festuca rubra</i> L.	4.2	28.4	0	0	0	44.8	22.6
<i>Festulolium braunii</i> Richt.	0	85.0	0	0	0	15.0	0
<i>Lolium multiflorum</i> Lam.	0	84.6	0	0	0	15.4	0
<i>Lolium x boucheanum</i> Kunch.	4.8	90.4	0	0	0	4.8	0
<i>Lolium perenne</i> L.	3.0	74.9	0	0	4.2	13.6	4.3
<i>Phleum pratense</i> L.	0	19.9	0	13.7	0	15.5	50.9
<i>Triticum aestivum</i> L.	0	87.1	0	6.8	0	1.8	0

Table 3

## Occurrence of eriophyoid species on wild and cultivated grasses

Host plants	Kind of sites	Number of eriophyoid species	Frequency
<i>Agropyron repens</i> (L.) P.B.	wild	4	90.9
<i>Agrostis vulgaris</i> L.	wild	2	66.7
<i>Alopecurus pratensis</i> L.	wild	5	80.0
<i>Apera spica-venti</i> (L.) P.B.	wild	2	50.0
<i>Arrhenatherum elatius</i> (L.) P.B.	wild	2	8.3
<i>Arrhenatherum elatius</i> (L.) P.B.	cultivated	2	25.0
<i>Avenastrum pratense</i> (L.)	wild	2	50.0
<i>Bromus erectus</i> Huds.	wild	2	16.7
<i>Bromus inermis</i> Leyss.	wild	4	75.0
<i>Bromus inermis</i> Leyss.	cultivated	2	66.7
<i>Bromus mollis</i> L.	wild	4	40.9
<i>Bromus racemosus</i> L.	wild	3	42.9
<i>Bromus sterilis</i> L.	wild	2	50.0
<i>Bromus tectorum</i> L.	wild	2	33.3
<i>Dactylis glomerata</i> L.	wild	4	82.6
<i>Dactylis glomerata</i> L.	cultivated	1	23.1
<i>Festuca arundinacea</i> Scherb.	cultivated	4	66.7
<i>Festuca ovina</i> L.	cultivated	1	33.3
<i>Festuca pratensis</i> Huds.	wild	1	33.3
<i>Festuca pratensis</i> Huds.	cultivated	5	78.6
<i>Festuca rubra</i> L.	wild	1	25.0
<i>Festuca rubra</i> L.	cultivated	4	80.0
<i>Festulolium braunii</i> Richt.	cultivated	2	20.0
<i>Hordeum murinum</i> L.	wild	1	42.9
<i>Lolium multiflorum</i> Lam.	cultivated	2	40.0
<i>Lolium x boucheanum</i> Kunch.	cultivated	3	75.0
<i>Lolium perenne</i> L.	wild	4	72.7
<i>Lolium perenne</i> L.	cultivated	5	82.4
<i>Phalaris arundinacea</i> L.	wild	1	50.0
<i>Phleum pratense</i> L.	wild	4	62.5
<i>Phleum pratense</i> L.	cultivated	4	58.3
<i>Poa angustifolia</i> L.	wild	1	50.0
<i>Poa pratensis</i> L.	wild	3	16.7
<i>Poa trivialis</i> L.	wild	2	37.5
<i>Trisetum flavescens</i> (L.) P.B.	wild	2	60.0

auricles. On some grass species the eriophyoid mites mainly *A. mckenziei* inhabited also the inflorescence. According to some authors the eriophyoid mites show certain feeding preferences related with the host plant and the place of their colonization on the plant (Nault and Styer 1969; Boczek et al. 2000; Skoracka 2000).

The intensity of occurrence of mites varied and depended on the host plant and the mite species. The mean intensity ranged from 0.1 to 6 mites per cm<sup>2</sup> of leaf area. The occurrence of *A. dubius* on *Bromus mollis* was the exception since its numbers reached up to 45 mites per cm<sup>2</sup> of leaf area and over 100 mites in the inflorescences. For the first time this species

was recorded in the inflorescences of *Helictotriochon pratensis*, *Bromus mollis* and *B. sterilis* in Austria (Nalepa 1891).

The mites present on grasses produced different visible damages. There were observed leaf discoloration, matting and browning. *A. hystrix* and *A. mckenziei* were the main pests causing the injuries. The noted symptoms were the most often the results of the plant reaction to morphological, biochemical and physiological changes caused by mite feeding and that influenced the plant growth (Kozłowski 1998). *A. dubius* causing the twisting of the leaf edges on few grass species inhibited their growth.

Two of other listed species transmit severe virus diseases. *Abacarus hystrix* vectors ryegrass mosaic virus (RMV) and agropyron mosaic virus (AMV) while *Aceria tosichella* is a vector of wheat streak mosaic virus (WSMV). The two virus diseases RMV and WSMV were recorded in Poland (Boczek 1999; Jeżewska and Wieczorek 1998; Kozłowski 2000). The present and previous studies have revealed that the eriophyoid mites colonize the wide variety of the cultivated and the wild growing plants (Boczek and Skoracka 2000; Boczek et al. 2000; Kozłowski 2000; Skoracka 2000). It plays the important role for their survival in the environment of crops. Due to their capability to inhabit the wild growing weeds in crops they can easily overwinter and in the next growing season can colonize the newly emerged wheat plant causing the significant losses.

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## VI. POLISH SUMMARY

### WYSTĘPOWANIE SZPECIELI (*ACARI: ERIOPHYOIDEA*) NA TRAWACH UPRAWIANYCH I DZIKO ROSNĄCYCH

W latach 1999–2000 na terenie wielkopolskiego subregionu klimatycznego prowadzono badania nad występowaniem szpecieli (*Eriophyoidea*) na trawach (*Gramineae*). Obecność szpecieli stwierdzono na 29 gatunkach traw spośród 40 zbadanych. Znalezione dziewięć gatunków szpecieli: *A. compactus*, *A. hystrix*, *A. tenuis*, *A. tosichella*, *A. mckenziei*, *A. dubius*, *Aceria* spp. i *Eriophyes* sp. Szpeciele wystąpiły w 38% wszystkich zbadanych prób roślin. Najczęściej zasiedlane były rośliny *Agropyron repens* i *Lolium perenne*, a najrzadziej *Arrhenatherum elatius*. Najczęściej występującymi gatunkami szpecieli były: *Abacarus hystrix* i *Aculodes mckenziei*. Szpeciele te występowały w jednogatunkowych populacjach lub w towarzystwie dwóch lub trzech innych gatunków. Miejscem występowania roztoczy na roślinach żywicielskich była głównie górna strona liści. Niektóre gatunki (*A. dubius*, *A. tosichella*) zasiedlały także dolną stronę liści, pochwy liściowe i kwiatostany. Średnie nasilenie występowania szpecieli wahało się od 0,1 do 6 osobników na cm<sup>2</sup> liścia w zależności od gatunku traw. *A. dubius* osiągał średnią liczebność 19 osobników na cm<sup>2</sup> liścia i ponad 100 osobników w kwiatostanach *Bromus mollis*. *A. hystrix* i *A. mckenziei* powodowały zmatowienie i zbrązowienie liści niektórych gatunków traw, a *A. dubius* zwijanie brzegów liści.