

OBSERVATIONS REGARDING THE SPREADING AND CONTROL THE INVASIVE WEEDS FROM A NATURAL PASTURE

OBSERVATII PRIVIND RĂSPÂNDIREA ȘI COMBATERICA PLANTELOR INVAZIVE DIN PAJISTILE NATURALE

Nela TALMACIU, Ramona HUMA

*University of Agronomy Sciences and Veterinary Medicine of Iassy
M. Sadoveanu Alley, No 3, 700490, Iassy, Romania, E-mail: nthalmaciu@yahoo.com*

Abstract: Fodder production and grazing represents an important activity in zootechny, especially for cattle taking into account, that from production expense, those for animal food represents the greatest weight. In majority pasture ecosystems exploited by grazing, it is happening a transformation of flora composition, frequently through adaptation in this surfaces with desirable species with low economic value. The control of invasive plants, known with generic name weeds, comune in all agroecosystems, require height costs, determinating a major cost of production, correlated with a low work productivities in this economyc sector with major importance. Our preliminary research performed in pastures from central region of Moldavia which were exploited in a non-rational and inadequate mode have showed that some plants with small fodder qualities or which have the capacity to synthesize some toxic substances for animals, has been multiplied very much becoming invasive weeds (*Lepidium draba*, *Euphorbia cyparissias*, *Artemisia* sp., etc), wich decrease dramatically the productivity of the ecosystems. The observations were made in year 2008 in a natural pasture from the department of Iassy, northeast of Romania. This paper presents the observations regarding the biological control agents which can limitate the *Lepidium draba* populations.

Rezumat: Producția de furaj obținută prin exploatarea ecosistemelor practicele, reprezintă o importantă activitate în economia creșterii animalelor, în special a bovinelor și ovinelor, dacă avem în vedere faptul că din totalul cheltuielilor de producție, cele cu furajarea animalelor, ocupă ponderea cea mai mare. În majoritatea ecosistemelor practicele, în special a acelor exploatare prin pășunat, are lor și o schimbare a compoziției floristice, adesea prin invadarea acestor suprafețe cu specii de plante care le depreciază valoarea economică, atât din punct de vedere cantitativ cât și calitativ. Combaterea acestor plante invazive, cunoscute sub numele generic de buruieni, comune în toate agroecosistemele, necesită costuri ridicate, determinând o creștere a costurilor de producție, corelat cu diminuarea productivității muncii în acest sector economic de importanță majoră. Din cercetările noastre preliminare efectuate, în urma exploatărilor neraționale sau necorespunzătoare a unor pășuni din zona centrală a Moldovei, s-a constatat că o serie de plante cu calități furajere mici, sau care au capacitatea de a sintetiza unele substanțe toxice pentru animale, s-au înmulțit în număr foarte mare, devenind buruieni - problemă (*Lepidium draba*, *Euphorbia cyparissias*, *Artemisia* sp., etc.), scăzând dramatic productivitatea acestor ecosisteme. Observațiile au fost efectuate în anul 2008 într-o pajiște naturala situată în județul Iasi, în partea de nord-est a României. În această lucrare prezentăm observațiile privind principalii agenți biologici de combatere care pot limita populațiile de *Lepidium draba*.

Keywords: natural pasture, invasive weeds, biological control agents
Cuvinte cheie: pajiști naturale, plante invazive, agenți biologici de control

INTRODUCTIONS

The general objective of the paper the discovery of the mechanisms through which some weeds are managing to invade many praticol ecosystems which are exploited by grazing

in the Moldavian Central Plateau and searching for some practical solutions to rehabilitate these deteriorated areas, especially by the improvement of the exploitation methods using some biological limiting factors in correlation with.

These invasive plants are managing to replace the natural species, already adapted to the local soil and climatic conditions, through many means, but all are correlated with the anthropic factor, by the wrong methods of exploitation of these ecosystems.

The control of invasive plants, known with generic name weeds, common in all agroecosystems, require high costs, determining a major cost of production, correlated with a low work productivities in this economic sector with major importance.

Taking into account that in these ecosystems, usually having a great floristic diversity, the herbicides could not be utilized because their large action spectrum; the control of these undesirable plants represents a hard and actual problem.

One of the control strategy to keep the invasive weeds at tolerated level, could be using at maximum the natural limitative factors, such as specific pests and phytopathogenic agents, correlated with type of exploited agroecosystems.

The observations were made in year 2008 in a natural pasture from the department of Iassy, northeast of Romania.

The site is used as a pasture for peasants' cattle from the neighbouring villages and is heavily overgrazed. We believe cattle avoid grazing *Lepidium draba* and in combination with the disturbance caused by the livestock, this is assumed to favor *Lepidium draba*, which now dominates this site, and may have facilitated its increase to the exceptional current population.

Three of the most promising biological control agents, the gall-forming weevil *Ceutorhynchus cardariae*, the flea beetle *Psylliodes wrasei*, and the gall mite *Aceria drabae* occur at this site. Attack by the three most promising herbivores can easily be distinguished by external inspection. This will allow an estimate of herbivore impact of each species at the individual plant level.

MATERIAL AND METHODS

The experiment to have been arranged in a full factorial randomized block design using six blocks of 16 x 32 m each.

Within each block, one plot of the surface 16 x 23 m to have been disturbed (harrowed), one plot of the surface 16 x 23 m to have been disturbed and cultivated and mixture of grass seeds and *Lotus* and one plot of the surface 16 x 23 m, to let undisturbed. Within each disturbed and undisturbed half-block, 4 (3 x 3 m) plots, separated by 2m buffer zones, will be established, resulting in 72 plots per site.

In each 3 x 3m plot, a smaller (0,5 x 0,5m) sub-plot will be established, which in ten plants of *Lepidium draba*, to have been individually marked.

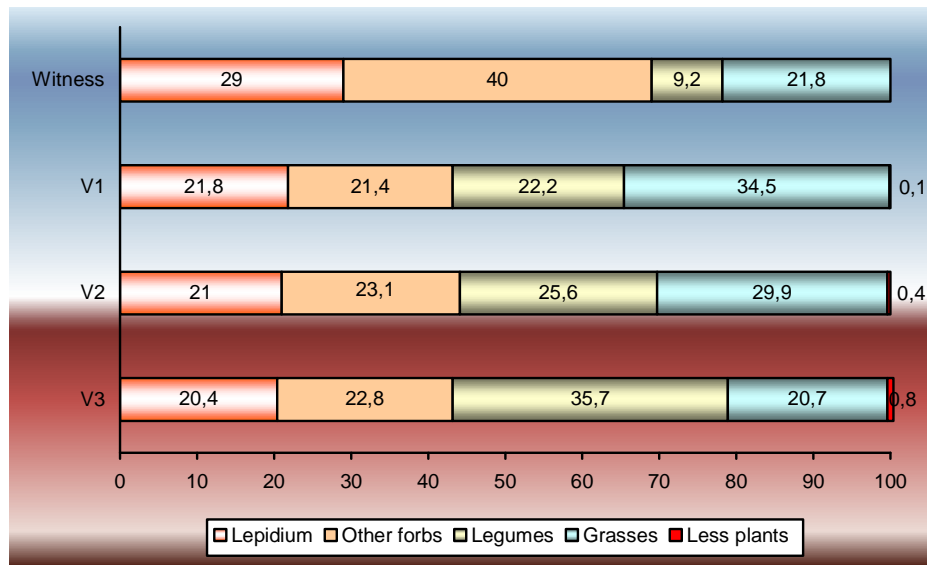
The following traits to have been regularly recorded for each plant between May: phenological stage (seedling, rosette, bolting, flowering, etc), the number of shoots per plant, their height and any signs of insect or mite damage.

RESULTS AND DISCUSSION

Lepidium draba L. (*Brassicaceae*) is a perennial mustard, indigenous to southwestern (Caucasus region) and central Asia. *Lepidium draba* L., is an aggressive invader capable of thriving in nearly all types of soil and habitats, but grows particularly well in disturbed and irrigated areas. It is usually avoided by cattle, but if grazed it can be toxic to livestock. *Lepidium draba* L. displaces valuable pasture forage species and reduces native biodiversity.

The site is used as a pasture for peasants' cattle from the neighbouring villages and is heavily overgrazed. We therefore established eight additional 3x3 m plots outside of exclosures in May as comparison.

The estimation percent were did on three lots of 0,5x0,5m from each variant of thing of 3x3m (the central lot another addition twain selected randomized lots) using five category: % *Lepidium draba*; % Leguminosae; % other forbs; % grasses and % deprived soil vegetation / litiera. The estimation in percent were did for all one 72 of variant.



V 1 – undisturbed plot; V 2 – disturbed plot; V 3 – disturbed and cultivated plot

Figure 1. Estimation of ground cover vegetation

One in three variants, media of ground cover vegetation is composed from:

- Plot no cultivation (V 1 – undisturbed plot): % lepidium were occupy with 21,8%; Other forbs were occupy with 21,4%; Legumes were occupy with 22,2%; Grasses were occupy with 34,5%; less plants were occupy with 0,1%.

- Plot cultivation no sowing (V 2 – disturbed plot): % lepidium were occupy with 21; % Other forbs were occupy with %; % Legumes were occupy with 25,6%; Grasses were occupy with 29,9%; less plants were occupy with 0,4%.

- Plot cultivation and sowing (V 3 – disturbed and cultivated plot) % lepidium were occupy with 20,4%; % Other forbs were occupy with 22,8%; % Legumes were occupy with 35,7%; % Grasses were occupy with 20,7%; less plants were occupy with 0,8%.

In lassy, sowing of a grass-legume mixture increased percent cover of legumes.

The observations concerning investigations atropodes fitofags the pathogenetic agents to *Lepidium draba* L. they were efectuate taking count of the phenology plants, to the date of (Table 1): 5.04, plants in phase of rosette and form's sake bonus stemlet; 27.04, plant of 10-15 cm, floral button; 12.05, plant of 20-30 cm, flowering 50%; 20.05, plant of 30-40 cm, the shaking 50%.

Structure pest species to *Lepidium draba* and attacked organ

The attacked organ	Stage	Species
Gall on root	Larves	<i>Ceutorhynchus assimilis</i> Paykull
Gall to based stems plants	eggs, larves	<i>Ceutorhynchus cardariae</i> Korotyayev
Organ plants : stems, leaf	Adult	<i>Ceutorhynchus assimilis</i> Paykull
	Adult	<i>Ceutorhynchus cardariae</i> Korotyayev
	Adult	<i>Baris semi striata</i> Boheman
	Adult	<i>Psylliodes wrasei</i> Leonardi & Arnold
Leaf, flowers	little larves	<i>Plutella xylostella</i> L.
Flowers	Adults, little larves	<i>Meligethes</i> spp.
	Adults, larves	<i>Aceria draba</i> (Nal.)
Leaf	Adults	<i>Colaphellus</i> spp.
	Mature larva	<i>Pieris napi</i> L.

Attack of shoots and root crowns, which were visible from the outside, was low in site. However, attack by *Ceutorhynchus cardariae* (Figure 3) and *Psylliodes wrasei* were likely underestimated because plants were only visually inspected for attack.



Figure 3. The gall *Ceutorhynchus cardariae* Korotyayev to based stems plants

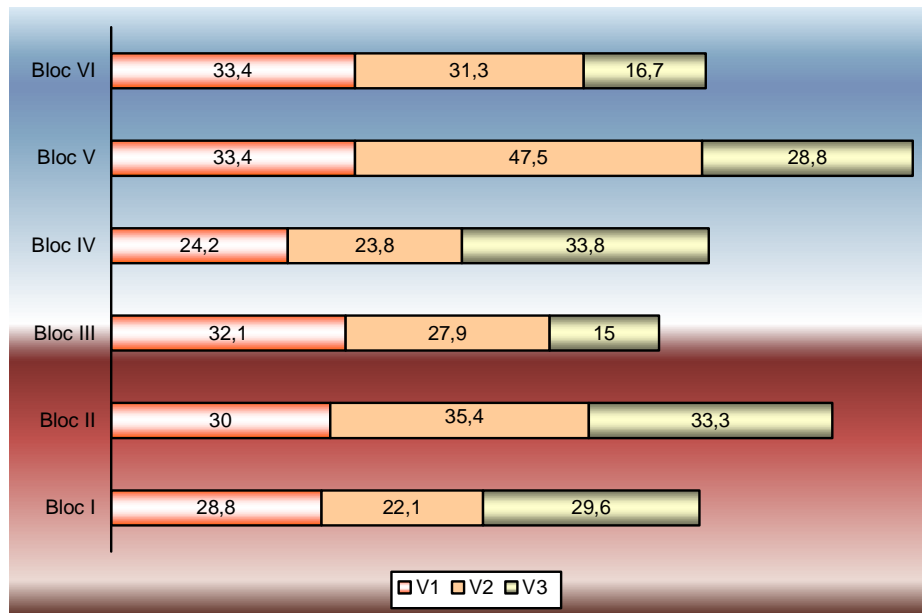
The gall mite, *Aceria drabae* Nal. (*Acari, Eriophyidae*), overwinters in dormant shoot buds of *Aceria drabae* Nal. In spring, the mite is passively carried up in the developing shoot where it feeds on meristematic tissue. The wind-dispersed mites have several generations per year and can reduce or completely prevent seed production. *Aceria drabae* Nal. causes galls, erineum and especially flower deformation leading to sterility.

In each 3x3 m plot, smaller 0,5x0,5 m subplots were established during April, and the number of *Lepidium draba* L. plants (ramets) was recorded. During May, plant traits

(phenological stage, number of shoots and height of each shoot) were recorded for a maximum of 10 plants per subplot, chosen along two diagonal lines.

In addition, any foliage damage, visible from the outside, was noted and, as far as possible, attributed to specific herbivore species.

This paper presents the observations regarding the biological control agents (% attack by gall mite *Aceria drabae* Nal.) of species *Lepidium draba* L. Attack is based on visual examination of plants (figure 2 and 3).



V 1 – undisturbed plot; V 2 – disturbed plot; V 3 – disturbed and cultivated plot

Figure 2. Percent attack of inflorescences by *Aceria drabae*

In the undisturbed plot (V 1), percent attack of inflorescences by *Aceria drabae* were contained between 24,2-33,4%,

In the disturbed plot (V 2), percent attack of inflorescences by *Aceria drabae* were contained between 22,1-47,5%.

In the disturbed and cultivated plot (V 3), percent attack of inflorescences by *Aceria drabae* were contained between 15-33,3%.

CONCLUSIONS

Lepidium draba L. is an aggressive invader capable of thriving in nearly all types of soil and habitats. Three of the most promising biological control agents, the *Ceutorhynchus cardariae*, the *Psylliodes wrasei*, and the *Aceria drabae*.

Attack by *Ceutorhynchus cardariae* and *Psylliodes wrasei* were likely underestimated because plants were only visually inspected for attack. Attack by gall mite *Aceria drabae* Nal., of inflorescences by *Lepidium draba* L., is based on visual examination of plants, were contained between 15 -47,5%.

However, due to management practices, most privately or commonly used pastures are now frequently overgrazed. Increased disturbance by livestock, coupled with increased nitrogen input in turn facilitates weed infestations, especially of plants that are unpalatable to cattle. In consequence, the diversity and abundance of desirable plant species decreases, and sites become dominated by one or few invasive species, leading to a degradation of these grassland ecosystems.



Figure 3. The gall mite *Aceria drabae* Nal. of inflorescences

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