

Consequences of plant-soil habitat transformation by Homoptera-Auchenorrhyncha

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An increasing soil contamination and advancing degradation of plant communities have been observed over more than 10 years in habitats subject to pollution with industrial emissions (Karkosze). Alterations in grass-herb communities as a result of the decline in trees and change in the chemical properties of the soil, induce a restructuring of Auchenorrhyncha species, changes in their abundance, as well as in their participation in element cycling and regeneration processes of degraded environments.

Chemical composition of liquid nourishment sucked out of plants (even when considering one plant species - *Calamagrostis villosa*, and with regard to one and the same froghopper species - *Neophilaenus exclamationis*) varies, depending on the rate of degradation of a given forested area. Plant juice filtered out in the insect alimentary canal usually contains elements in much higher concentrations than undigested food. The relative concentration of particular elements in excrements and in plants differs (Table 1)

Table 1 The quantity of certain compounds (in ppm) in plants and insect excrements.

	(ppm)	Na	N-NH ₄	N-NO ₃	K	Mn	Ca	Mg	Cl	S-SO ₄
I	grass	80	60	0	7200	73	817	330	1910	853
	excreta	2300	5	340	21500	25	660	1500	8350	1205
II	grass	70	67	1	9800	123	693	337	2587	1543
	excreta	330	100	60	13200	0	1160	700	3700	8

I-undamaged forest;

II-degraded forest.

The uptake of nutrients from plants by Auchenorrhyncha, which subsequently discard them with their excrements in a form readily assimilated by plants (but equally easily leached out of the habitat) causes an accelerated element cycling.

Droppings of excrements rich in mineral and organic compounds transform soil habitats. As

a consequence changes take place in the augmentation of soil organisms.

Table 2 Mesofauna in soil with plants.

		without	Auchenorrhyncha	with	Auchenorrhyncha
ACARINA					
Density	(N/m ²)		4166		43499
saproph./predators					
ratio			0.2		16.6
NEMATODA					
Pantophages	(%)		25		75
Predators	(%)		60		8
Collembola					
Isotomidae	(%)		79		42
Poduridae	(%)		0		56
Onychiuridae	(%)		12		1

Glasshouse experiments proved that discharges of Auchenorrhyncha excrements stimulated the development of microorganisms (bacteria and fungi), Acarina (saprophagous in particular), Nematoda (predatory and pantophagous) and also brought about changes in the abundance and dominance structure of the Collembola community (Table 2).