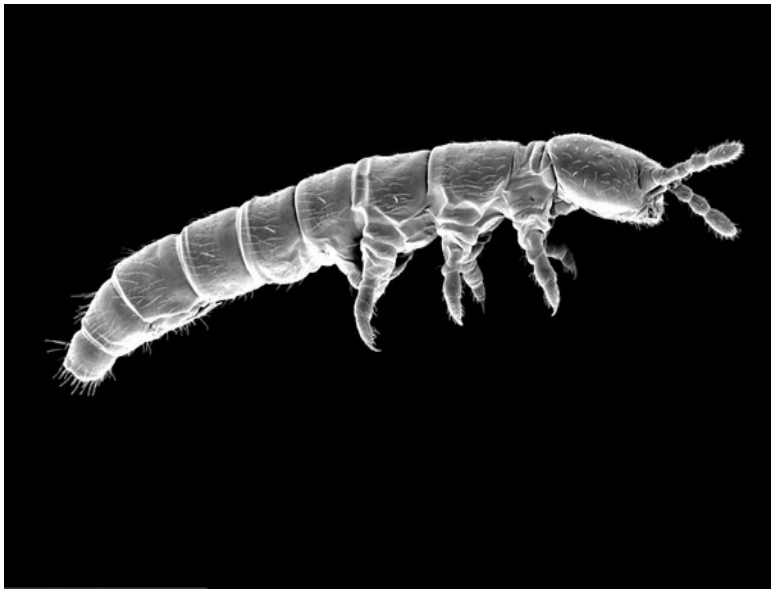
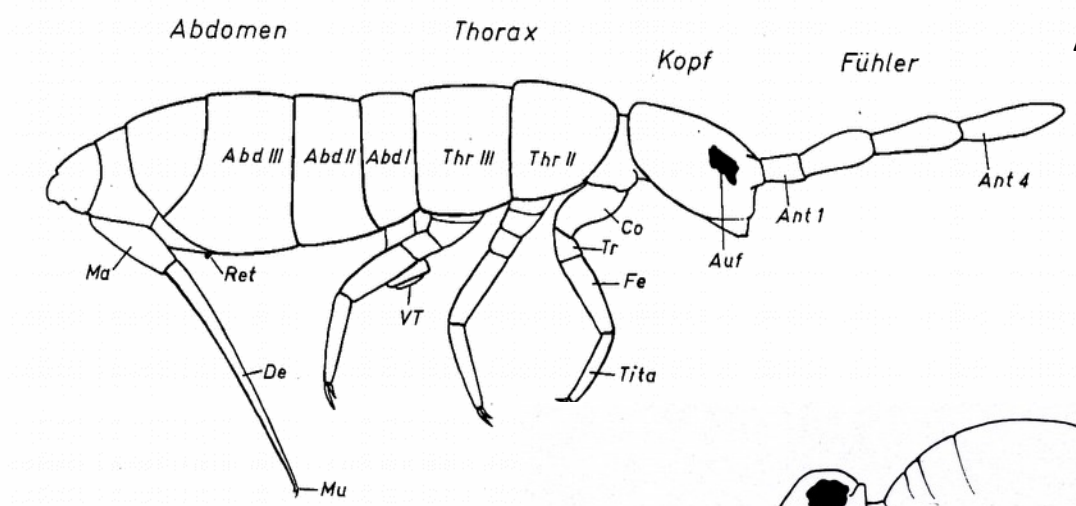
Wechselwirkungen zwischen COLLEMBOLEN und ökologischen Faktoren



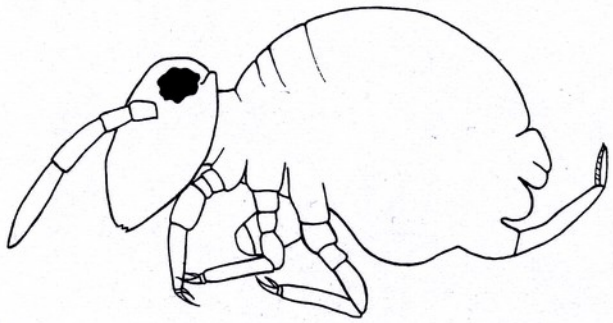
Bodenökologie WS 2014/15
Karoline Uteseny

Bewohner aller terrestrischen Lebensräume
Klassifizierung - > Lebensformtypen
(Gisin 1943, Bockemüll 1956)
Rusek 2007: Ökomorphologische Klassifizierung

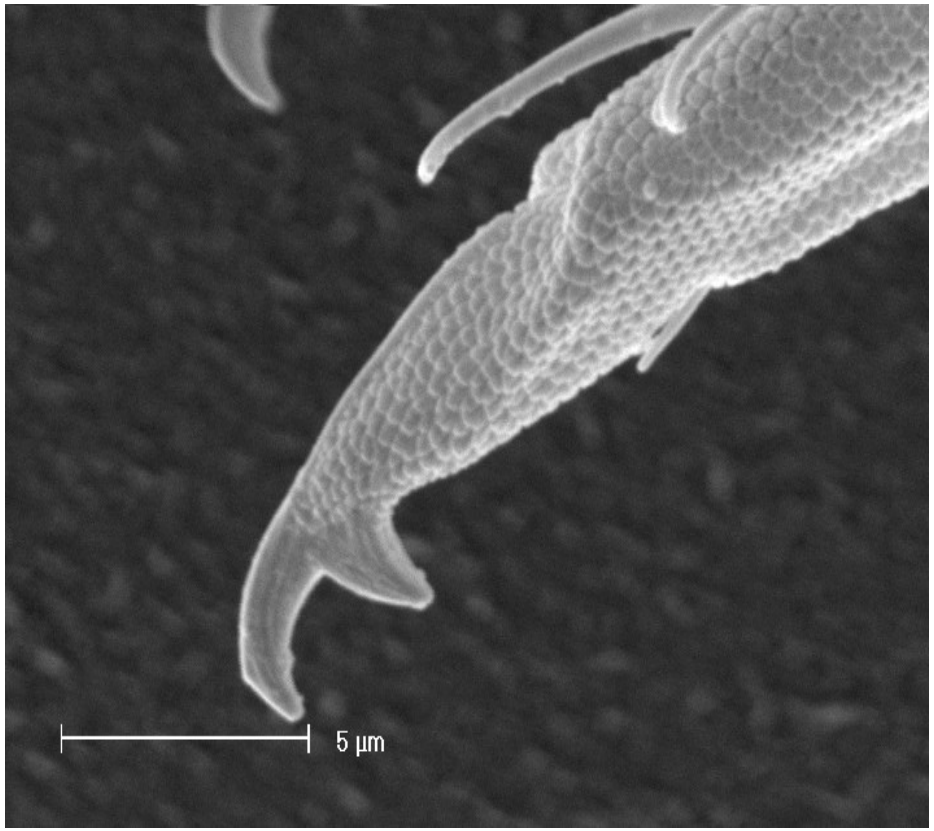


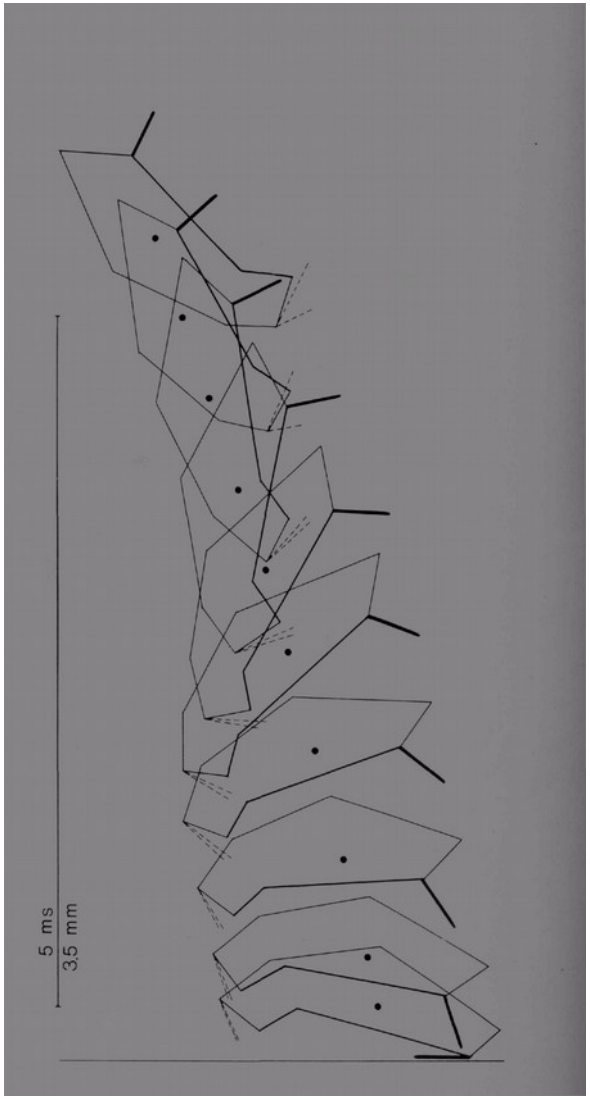
Arthropleona

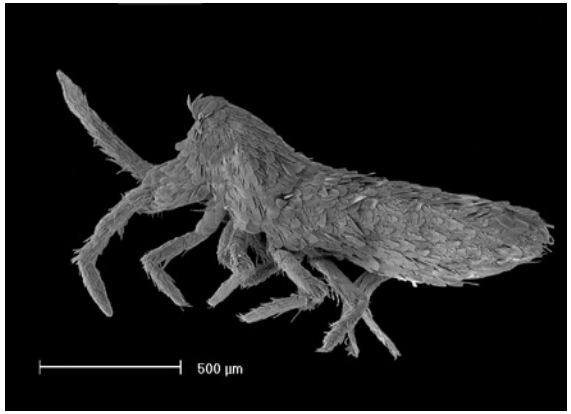
Symphypleona

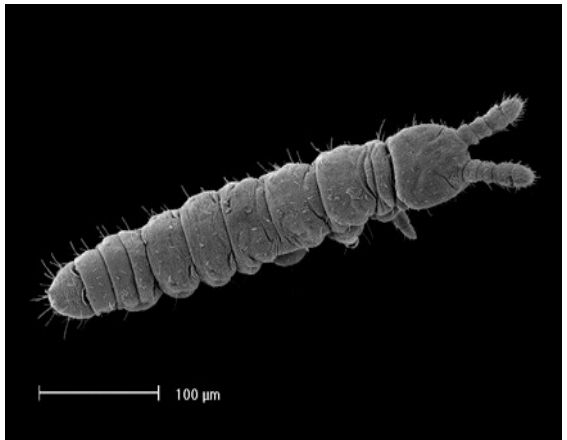


Sprungapparat





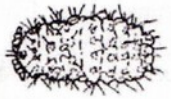




A. ATMOBIONTS

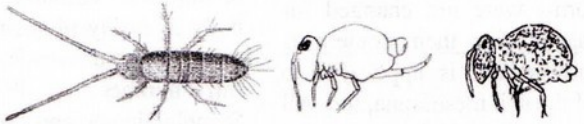
a. macrophytobionts 

b. microphytobionts 

c. xylobionts 

d. neustons 

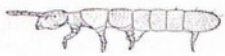
B. EDAFOBIONTS

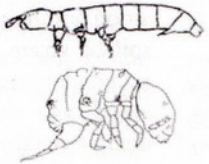
a. epigeonts 

b. hemiedaphobionts 1. upper  2. lower 

c. euedaphobionts

1. large size: a) with furca  b) furca reduced or missing 

2. medium size: a) with furca  b) furca reduced or missing 

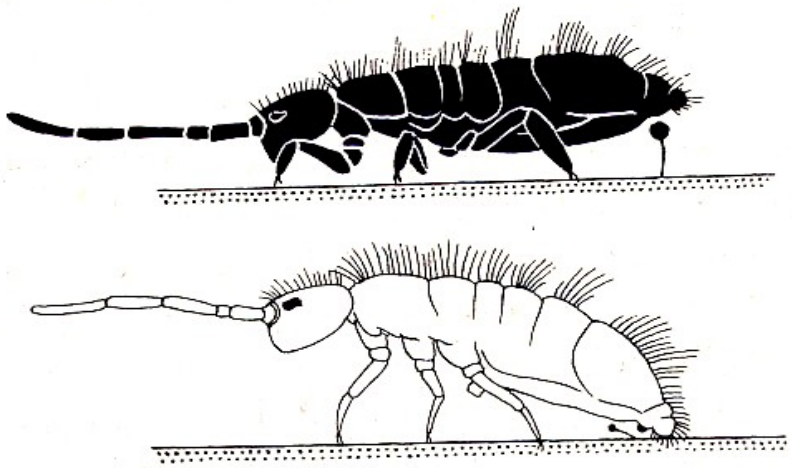
3. small size: a) with furca  b) furca reduced or missing 

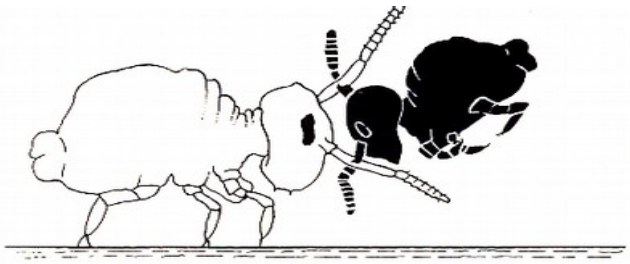
Onychiuridae

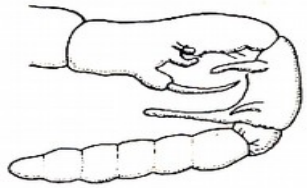
Table 1. Size and morphological characteristics of the proposed group, subgroups, classes and subclasses of edaphobionts and their preferred habitats in soil: The simple arrows show the direction of migration from the main habitat to the temporary ones in parenthesis. The double-faced arrows show vertical migrations through the soil horizons.

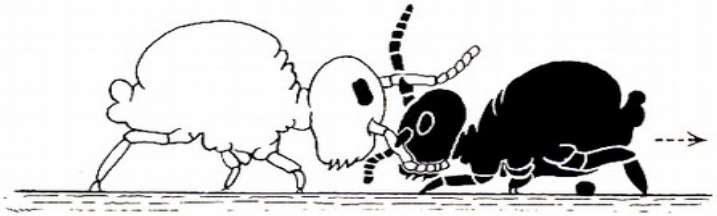
B.	EDAPHOBIONTS	Length in mm	Pigment	Eyes	Antennae	Preferred habitats in soil
Ba.	Epigeonts	0.2-5 (8)	+++	+++	long - medium	soil surface ↔ litter
Bb.	Hemiedaphobionts					(soil surface) ← litter (→upper A horiz.)
Bb1.	upper	>1	(+++)++(+)	++(+)(-)	medium	(soil surface) ← litter
Bb2.	lower	0.7-1	++(+)	+(-)	medium	litter (→upper A horiz.)
Bc.	Euedaphobionts					(litter ←) A, B, C horiz.
Bc1.	large size	>1	+/--	+/-	medium	(litter ←) A horiz.
Bc1a	with furca					
Bc1b.	furca reduced or missing					
Bc2.	medium size	0.7-1	+/--	+/--	medium-short	(litter←) A horiz. (→ B horiz.)
Bc2a.	with furca					
Bc2b.	furca reduced or missing					
Bc3.	small size	0.2-0.7	(+)--	(+)--	short	A horiz. ↔ B horiz. ↔ C horiz.
Bc3a.	with furca					
Bc3b.	furca reduced or missing					

Fortpflanzung



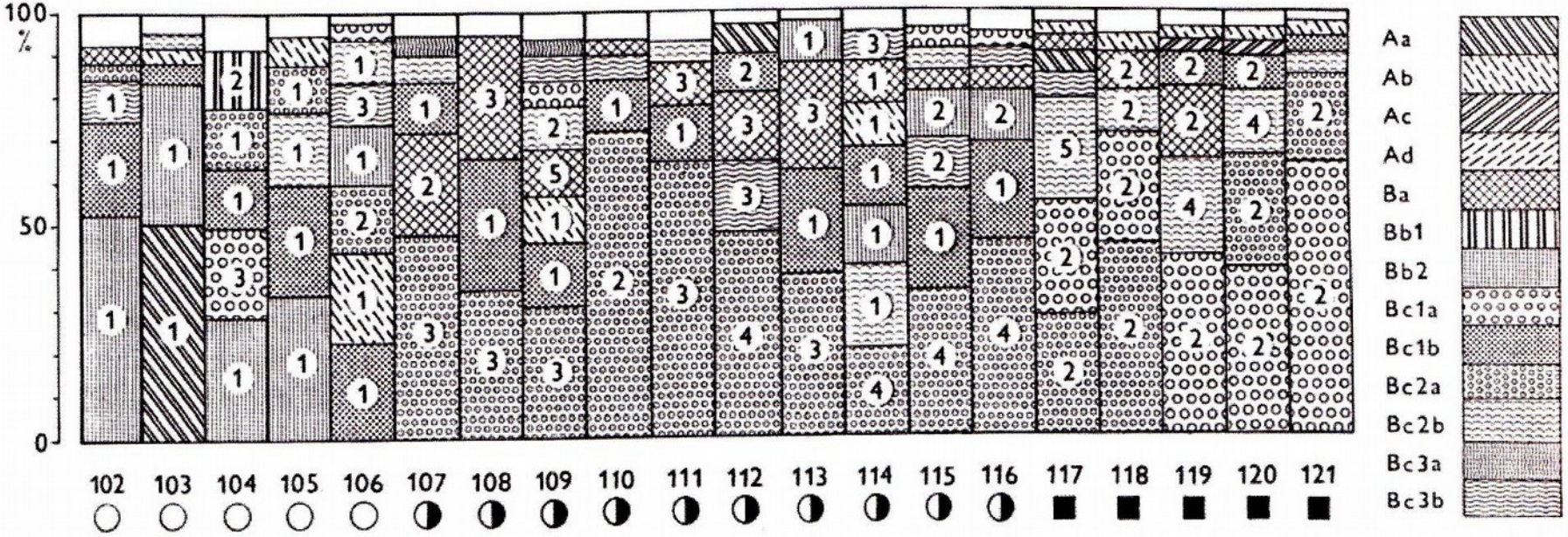






Tetrodontophora bielanensis

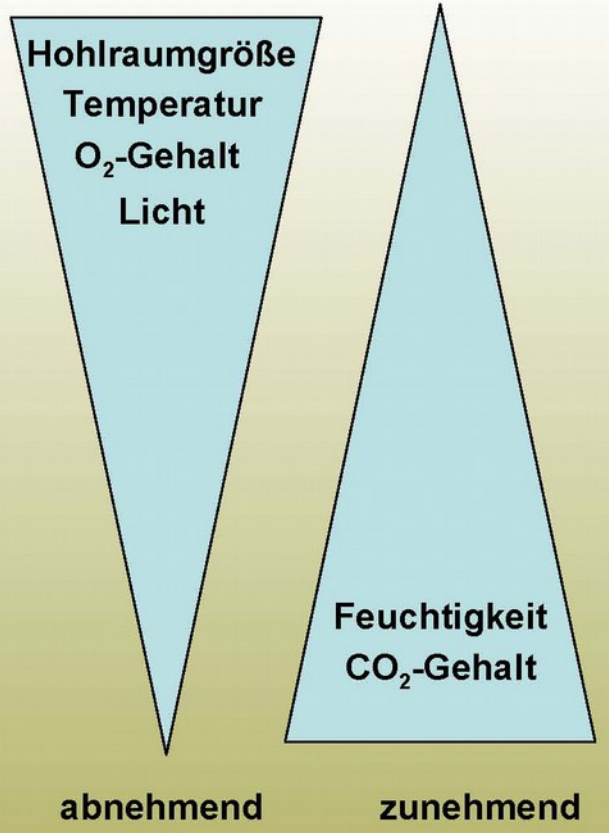
Bodenentwicklung - Rendzinaboden



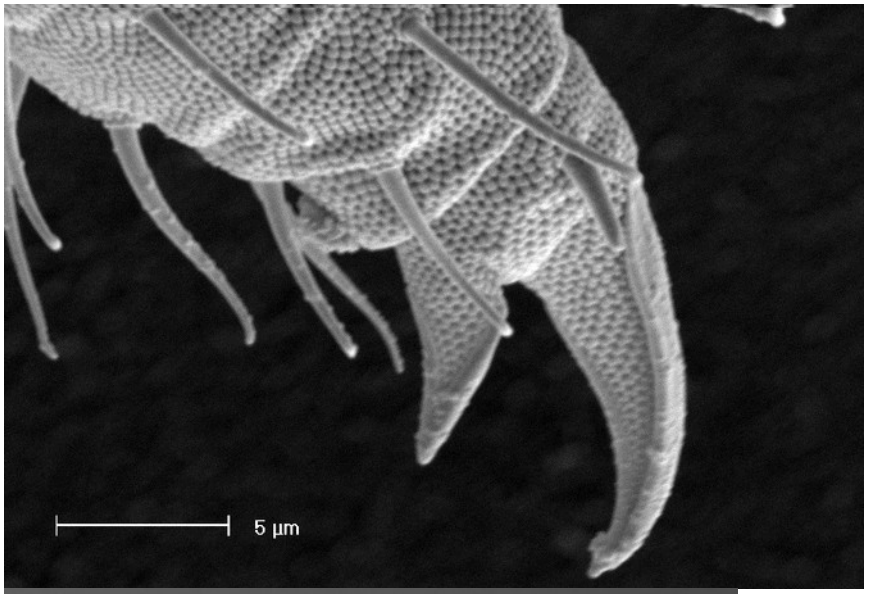
Lebensformen und Bodeneigenschaften

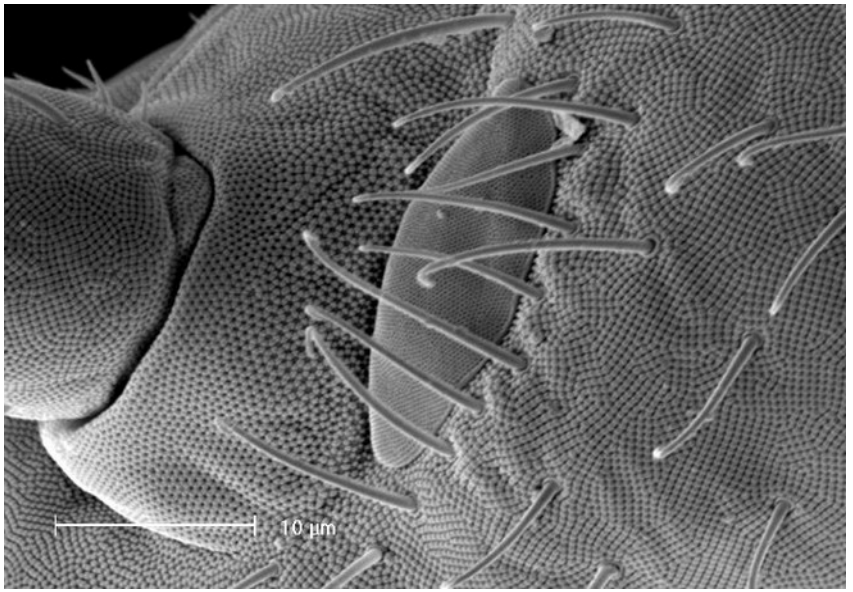
Anpassung von Körpergröße und Morphologie an die Bedingungen des Bodenprofils
am Beispiel der Springschwänze (Collembola)

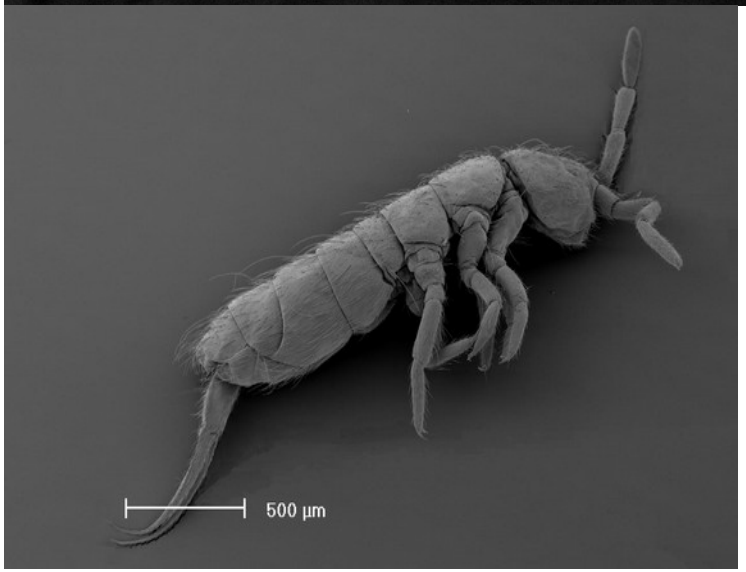
Ver. nach EISENBEIS (1985)

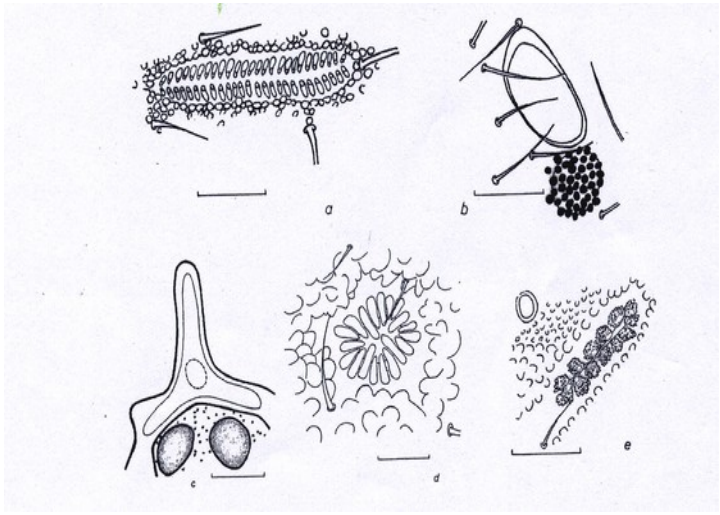


Bodenfeuchte
Morphologische und physiologische Anpassungen

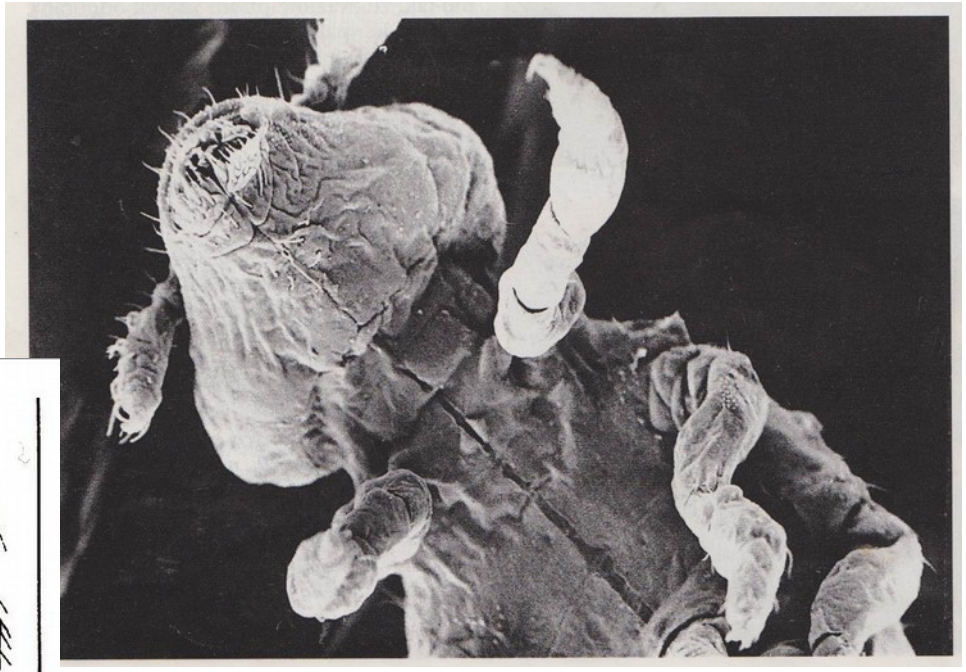


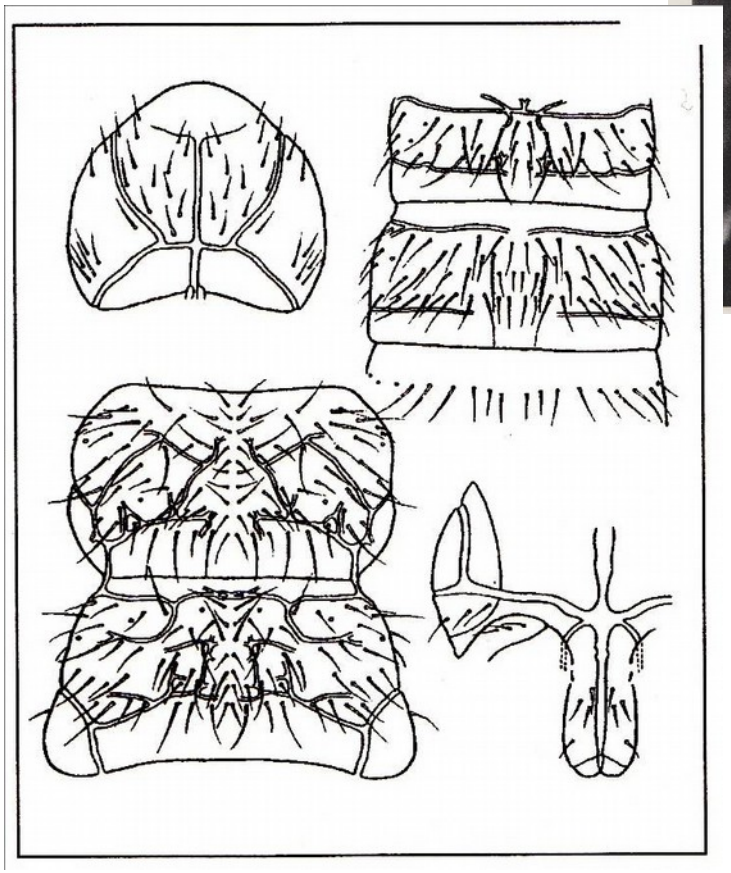




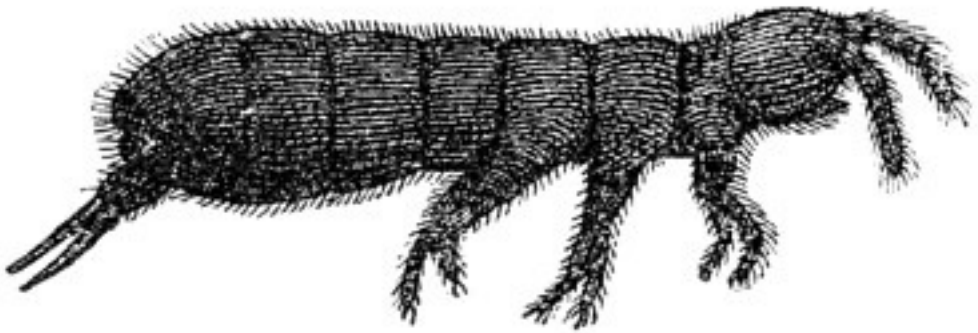


Wasserleitungssysteme

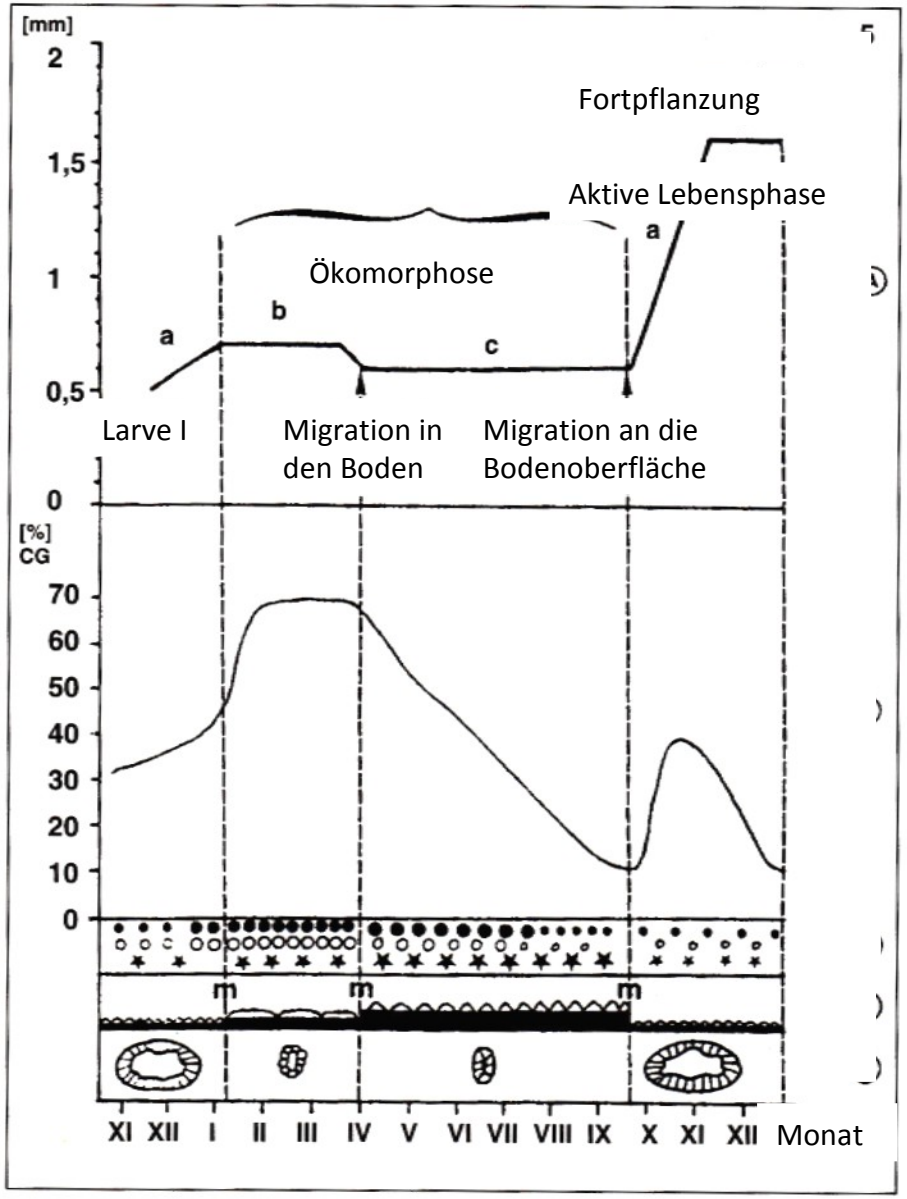


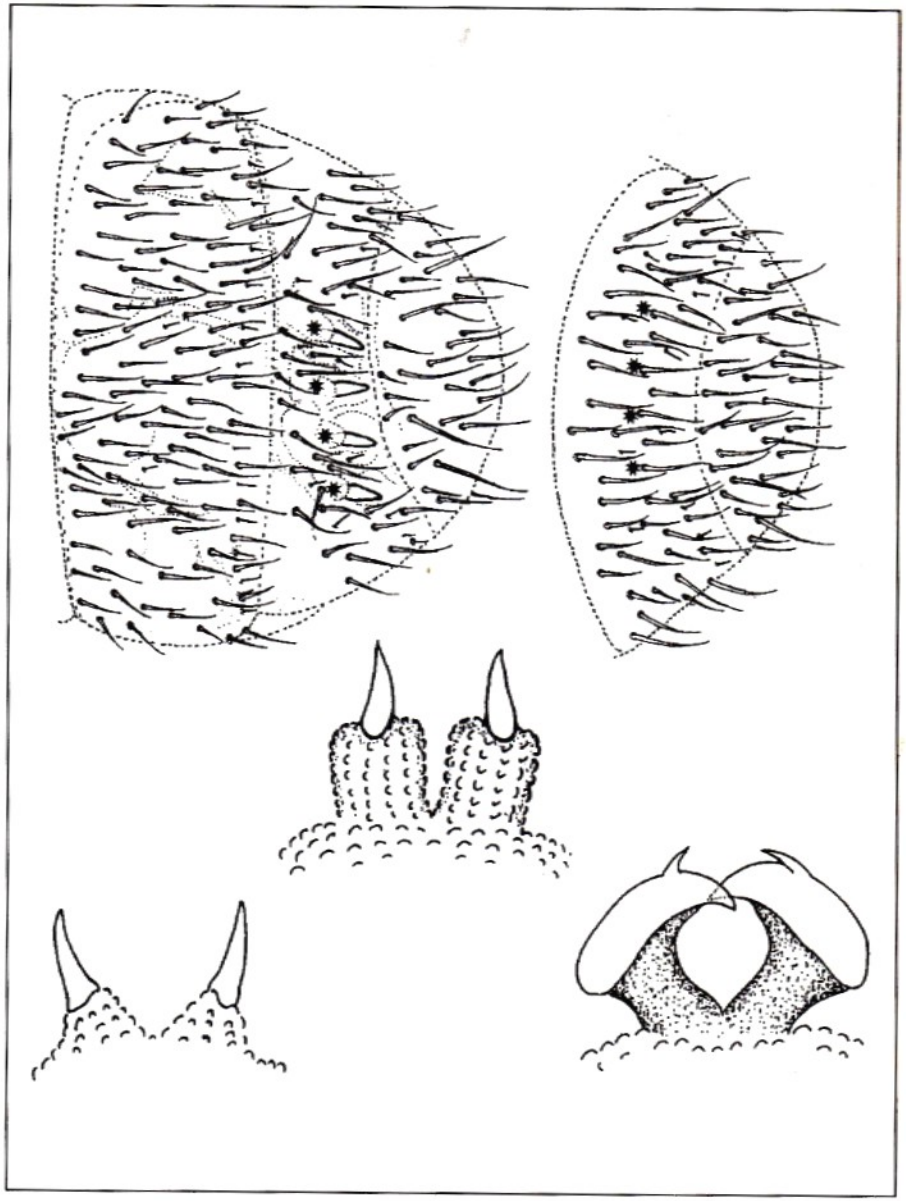


Kälteresistente Collembolenarten
Isotoma saltans



Temperatur - Ökomorphosen



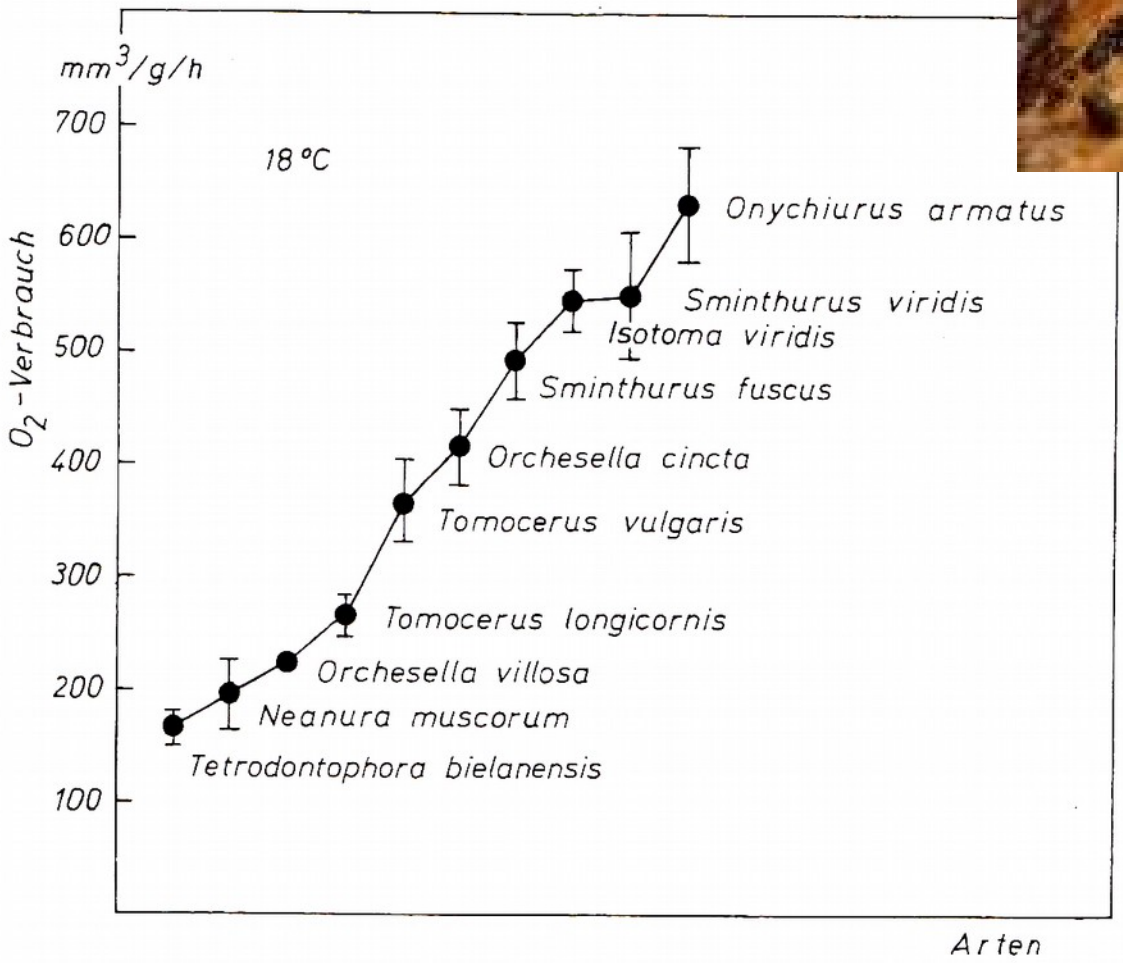


Hypogastrura baldorii

Isotoma gersi ; Hypogastrura purpurescens

Licht
Makrophytobiont

ATMUNG


mm³/g/h
700
600
500
400
300
200
100
O2-Verbrauch
18 °C
Onychiurus armatus
Sminthurus viridis
Isotoma viridis
Sminthurus fuscus
Orchesella cincta
Tomocerus vulgaris
Tomocerus longicornis
Orchesella villosa
Neanura muscorum
Tetrodontophora bielanensis
Arten

Funktion der Colllembolen

Abbau des organischen Materials:

Zerkleinerung des Bestandabfalls, Vergrößerung der Angriffsfläche für Mikroorganismen (Anregung der mikrobiellen Aktivität)

Bildung der Bodenmikrostruktur, Transport von Substrat und von Pilzsporen durch den Boden, Mobilisierung von Nährstoffen

Abweideeffekt: Stimulation von Stoffwechsel und Wachstum der Mikroflora, Erhöhung der Mineralisationsrate

Effekte sind abhängig von Temperatur, H_20, Substrat, Collembolenart