

Contents

1	Introduction	1
2	Material and methods	3
2.1	Soil-ecological field studies on an afforested reclaimed area	3
2.1.1	Study area	3
2.1.2	Study sites	4
2.1.3	Litter layer and soil properties	6
2.1.4	Soil microbial properties	8
2.1.5	Soil fauna	9
2.2	Microcosm experiments	10
2.2.1	Experimental design	10
2.2.2	Substrate	13
2.2.3	Litter	14
2.2.4	Animal species	16
2.2.5	Litter disappearance	17
2.2.6	Weight measurements and mortality of fauna	17
2.3	Statistical analyses and data presentation	17
3	Results	19
3.1	Soil-ecological field studies on an afforested reclaimed area	19
3.1.1	Litter layer and soil properties	19
3.1.2	Soil microbial properties	31
3.1.3	Soil fauna	37
3.1.4	Correlations	46

3.2 Change of selected soil properties considering the litter layer and its macrofaunal decomposition in microcosms	49
3.2.1 Litter disappearance	49
3.2.2 Soil microbial properties	54
3.2.3 Soil chemical properties	61
3.2.4 Relationships between soil properties and litter disappearance	74
3.2.5 Survival and litter utilization by <i>I. scandinavicus</i> and <i>L. rubellus</i>	77
4 Discussion	81
4.1 Effects of surface pattern on the development of afforested reclaimed areas	81
4.1.1 Effects of the surface structure in the course of succession	82
4.1.2 Influence of shelter wood species with respect to the surface structure	92
4.1.3 Influence of the surface structure with respect to the substrate texture	99
4.1.4 Effects of different nontarget plants compared with the effects of oaks	106
4.1.5 Relationships between detritivorous soil fauna, soil microorganisms and soil physical and chemical properties	112
4.2 The influence of litter on functional effects of <i>I. scandinavicus</i> and <i>L. rubellus</i>	114
4.2.1 Effects on the feeding behaviour	115
4.2.2 Feeding effects on soil microbial properties	118
4.2.3 Feeding effects on soil chemical properties	120
4.2.4 Litter utilization by <i>I. scandinavicus</i> and <i>L. rubellus</i> for their own benefit	122
4.3 Conclusions	125
5 Summary - Zusammenfassung	127
6 References	133
7 Appendix	149