SOIL FAUNA IN DIFFERENT SOIL MANAGEMENT FOR WATERMELON

FAUNA DO SOLO EM DIFERENTES MANEJOS DE SOLO PARA MELANCIA

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ABSTRACT: An experiment was carried out in Santa Maria, RS, to study the effects of different soil and leaf diseases management for watermelon on soil fauna. The treatments were: 1) Conventional Tillage (CT) 2) CT with strip (s) without plowing; 3) No-Till (NT)+Chisel (Ch)+Herbicide (H); 4) NT+Ch without H; 5) NT+H and 6) NT. All NT had black oat straw over the soil. The subplots had the leaf disease control treatments: 1) Check Plot, without control; 2) Chemical, with fungicide; Ecological, with a mixture of "calda bordalesa" + "Supermagro" + "Alhol". Tretzel pitfalls traps were placed in plots before seeding and in subplots during watermelon vegetative cycle. Samplings were done: at 45 and 5 days before and at 30, 67 and 90 days after watermelon seeding. Each trap stayed 4 days at field. Were calculated richness, abundance and Simpson's diversity index (SDI). Acari population was higher in CTs than NT+Ch and Collembola population was higher in CTs than in NT+Ch+H, NT+Ch e NT+H, before watermelon seeding. However, Collembola population in CT and CTs was smaller than NT at 90 DAS. Coleoptera population was smaller in CTs than in NT+Ch+H and NT, while Hymenoptera population was not affected by soil management. Conventional tillage in strips decreased richness at 5 and 30 days before watermelon seeding and abundance at 90 DAS. NT treatments didn´t affect richness and abundance. Chemical leaf disease management increased abundance. Simpson's diversity index was not affected by soil management nor by leaf disease management.

KEYWORDS: Richness. Abundance. Simpson's diversity index. No-till. Watermelon.

INTRODUCTION

In Rio Grande do Sul State, Brazil, watermelon is a crop cultivated mainly by small farmers in sandy soils, with serious problems of diseases and erosion. Recently, no-tillage system to control soil erosion and some ecological treatments to control leaf diseases are being introduced, but their effects on soil fauna are not well known. The distribution and permanence of arthropods in the soil may vary with the availability of food, moisture, porous space, oxigen, temperature, flood, crop management systems, pesticides used, organic matter content, tillage, predation, among others (BUTCHER; SNIDER; SNIDER. 1971).

Soil fauna is the organisms that live part of its life cycle in the soil, and may interfere in chemical, physical and biological caracteristics of the soil and being by them influenced. These organisms, in this way, may work as soil quality indicators (COLEMAN; HENDRIX, 2000).

Acari contribute for plant residues decomposition and its excrements favors humification process (MADONG; NKOLBISSON, 1999; WALLWORK, 1971). Acari distribuition is limited by high temperatures, low humidity and compacted soils (WALLWORK, 1971). For Badejo and Ola-Adams (2000), low pH and organic matter decresead Acari density in cassava. Badejo and Tian (1999) found that soil cover affected Acari abundance and diversity in the soil.

Collembola fragments plant residues, incorporating them in the soil, influencing soil fertility by the estimulation of microorganisms activity and by the distribution of spores of fungi and by the inibition of fungi and bacteria that causes diseases in plants. Population growth is limited by food availability, mainly amount and type of plants. Most of Collembola lives close to soil surface, until five centimeters, and compaction affects their vertical distribution in the soil profile (HALE, 1971; SAUTTER; SANTOS, 1991;). They were sensible to soil tillage (GRANHA, 1999), having no-till incresead its

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population by higher food availability and decreasing temperature variability (SAUTTER; SANTOS, 1991).

Ants prefer warm temperatures, living mainly in tropical regions (STORK; EGGLETON, 1992) and, are considered as main bioturbation organisms. Ants mix excaveted soil with animals and plants residues carried for the nest, increasing carbon, nitrogen and phosphorus around the nest, favoring root growth deep in the soil. After Granha (1999), Hymenoptera were sensible biological indicators to soil tillage.

The objective of this study was to evaluate different soil management systems and different leaf disease management for watermelon on soil fauna.

MATERIALS AND METHODS

This work was carried out in a farm 11 km far way from the Federal University of Santa Maria, Santa Maria county, Rio Grande do Sul state, Brazil, in the 2000/2001 agricultural year. Climate of the region is Cfa (Köeppen classification), with annual mean rainfall of 1707 mm, annual mean temperature of 19,2°C (INSTITUTO DE PESQUISAS AGRONÔMICAS, 1989). The region is situated close to coordinate 29° 45' 12'' of South latitude and 53° 40' 30'' of West longitude from Greenwich. The experiment was conducted in a Typic Hapludalf soil, sandy texture, with gentle slopes between 3 e 5%, over a native grasssland, constituted mainly of *Paspalum spp,* which was mowed.

Experimental design was random blocks with subdivided plots, with four replications. Main plots had 6.0 x 7.5 m and were subdivided in three, measuring 6.0 x 2.5 m.

Black oat was seeded in 27/05/2000 in treatments 3 to 6. Liming, in the dosis of 1.74 t/ha of dolomite calcareous, was distributed manually in soil surface in 28/05/2000. Fertilization used consisted of 300 kg/ha of the formula 05-20-30 in the seeding row and at 40 and 59 DAS, it was applied 35 and 50 kg/ha of N, respectively. The main treatments were applied for occasion of the management of the black oat straw (4.3 t/ha), desycated and rolled 132 and 139 days after black oat seeding, respectively.

Treatments (soil management systems) applied for watermelon were:

1 - CT - Conventional Tillage (CT), with moldboard plow (20 cm depth) and disking twice over natural pasture, which was desycated togheter with black oat, using same equipment, dosis and herbicide. Watermelon seeding was done with holes system.

2 - CTs - CT in strips (s), being 2 strips plowed and disked, separated by a strip of natural grasses measuring 2.5 m. Watermelon seeding was performed as in CT.

3 - NT+Ch+H – No-till (NT) of watermelon on area cultivated previously with black oat in NT, chiseled (Ch) and weed control with herbicide (H) in post-emergency. Watermelon seeding was performed with no-till driller adapted for watermelon. The herbicide used was Sethosydim (1.25 L/ha) plus oleaginous assistant (0.5% of the syrup volume) applied with manual costal pulverizer, gauged to consume 200 L/ha of syrup, 50 days after watermelon seeding.

4 - NT+Ch - NT of watermelon on area cultivated previously with black oat in NT, chiseled and without weed control. Watermelon seeding was the same as in treatment 3.

5 - NT+H - NT of watermelon on area cultivated previously with black oat in NT and weed control with herbicide in post-emergency. Watermelon seeding and herbicide application were the same as in treatment 3, but without use of chisel plow.

6 - NT - NT of watermelon on area cultivated previously with black oat in NT without weed control. Watermelon seeding was performed as in treatment 3.

The treatments in the subplots were: a) Check plot without control of diseases; b) Chemical - with chemical control of leaf diseases with fungicidal Thiophanate methyl 700 PM, apllied in dosis of 70 g/ha at 30, 50, 63 and 78 days after seeding (DAS); c) Ecological - with agroecology control of leaf diseases, with a mixture of "calda bordalesa" (0.5%) + compost of cattle manure with micronutrients "Supermagro" (3.0%) + "Alhol" (2.0%) at 30 and 50 DAS and of "calda bordalesa" (0.5%) + "Supermagro" (3.0%) at 63 and 78 DAS.

At 13/10/2000, watermelon seeding was performed (Citrullus lanatus Schrad) in holes in the treatments with conventional tillage (CT) and CT in strips, and in rows in others treatments involving no-till. Spacing was 2.5 x 1.5m (among rows of holes and between holes in rows, respectively) and 0.75 x 2.5 meters (among plants in the rows and between rows, respectively).

The variety used was JUBILEE II, with cycle around 90-95 days. The final population was 5333 plants per hectare.

Dolomite lime was applied in dosis of 1.46 t/ha in the bottom of the hole and covered with soil in treatments with CT and on soil surface and beside seeding rows in treatments with NT.

Fertilization of 604 kg/ha of the mixture of urea (50 kg), triple superphosphate (238 kg) and potassium chloride (316 kg), applied in the hole and in seeding row. In 24/11/2000, nitrogen was applied for watermelon in dosis of 77 kg of N/ha in the urea form. This fertilizer was distributed on soil surface, close to watermelon plants.

For the chemical control of diseases of the aerial part, a fungicidal was used (Thiophanate methyl 700 PM - 70 g/100 L water) with applications at 30, 50, 63 and 78 DAS. The ingredients of the agroecological products for control of leaf diseases are described in full details in Burg and Mayer (2001).

In the survey of soil fauna, previous to watermelon crop, Tretzel traps was used (TRETZEL 1952), installed inside each plot and, during the watermelon cycle they were installed inside each subplot. The trap is constituted of a plastic flask (8.5 cm of diameter and 13.5 cm of depth), containing 200 ml of solution of alcohol 70% plus formol at 2%, buried in the soil, so that its board was at soil surface level and protected from the rain with a French tile. Five samplings were done: the first 45 days before watermelon seeding and the second 5 days before watermelon seeding and the others at 30, 67 and 90 days after seeding. Each sampling corresponded to 4 days of permanence of the traps in the soil. After each sampling, it was proceeded the identification and counting of the organisms in laboratory, with the aid of a magnifying glass.

The population of soil meso and macrofauna (X) collected was submitted to the transformation arch sin for variance analysis.

It was also calculated the richness (number of orders), the abundance (the individuals' sum of all orders) and the Simpson's diversity index (BEGON; HARPER; TOWNSEND, 1990; MARGALEF, 1977).

$$SDI = \frac{1}{\sum_{i=1}^{S} P_i^{\,2}}$$

Where: SDI = Simpson's diversity index.
S = total number of species in the community (richness).
i = *i*th species.
Pi = proportion of richness made up of the *i*th species.

RESULTS AND DISCUSSION

In the present work was studied the effect of soil management on the population of Acari, Collembola, Hymenoptera and Coleoptera, not only because they are the groups with larger number among the collected organisms, except the Coleoptera, but also due to its importance as components of soil fauna.

Through the statistical analysis of sampling data, the effect of soil management was evaluated in CT, CTs, NT+Ch+H, NT+Ch, NT+H and NT in different sampling times, done 45 and 5 days before seeding (DBS) and 30, 67 and 90 days after seeding (DAS) of the watermelon.

Acari

Data statistical analysis didn't accuse significant difference of soil management at different sampling times, agreeing with Lima et al. (2000), except for the sampling done at 90 DAS.

However, the effect of sampling time was significant, that is, that Acari population varied in time and not in function of the tested treatments, which was also observed already by Badejo, Tian and Brussaard (1995), Butcher; Snider and Snider (1971) and Madong and Nkolbisson (1999). The Acari had the largest population among the studied organisms, with average of 78 Acari / trap / sampling time, in a total of 9450 collected Acari.

Acari populacional flutuation is visualized in Figure 1A at different sampling times. The population of Acari presented similar behavior in all treatments in all different sampling times, with abrupt increase in the number of individuals in the sampling done at 5 DBS, compared with the sampling at 45 DBS, accentuated reduction in the number of individuals in sampling done 30 DAS, an increase to 67 DAS, except for NT+Ch and again a reduction to 90 DAS. This takes us to believe that the real cause of Acari populacional flutuation was conditioned by climatic conditions occuring during the sampling period (drought) and microclimatic resulting of higher (sampling at 5 DBS) or smaller density and height of vegetative covering (sampling at 45 DBS and 30 and 67 DAS). This probably allowed smaller humidity and temperature amplitude, what can be verified in sampling at 5 DAS over black oat in full flowering, what was already observed by Badejo, Tian and Brussaard (1995), Butcher, Snider and Snider (1971) and Madong and Nkolbisson (1999). In the sampling done at 90 DAS, CTs presented smaller number of Acari that NT+Ch, reflecting the direct effect of soil management on Acari population. This result agrees with the data obtained by Badejo and Ola-Adams (2000), that the intensive cultivation of cassava reduced Acari's density and diversity.

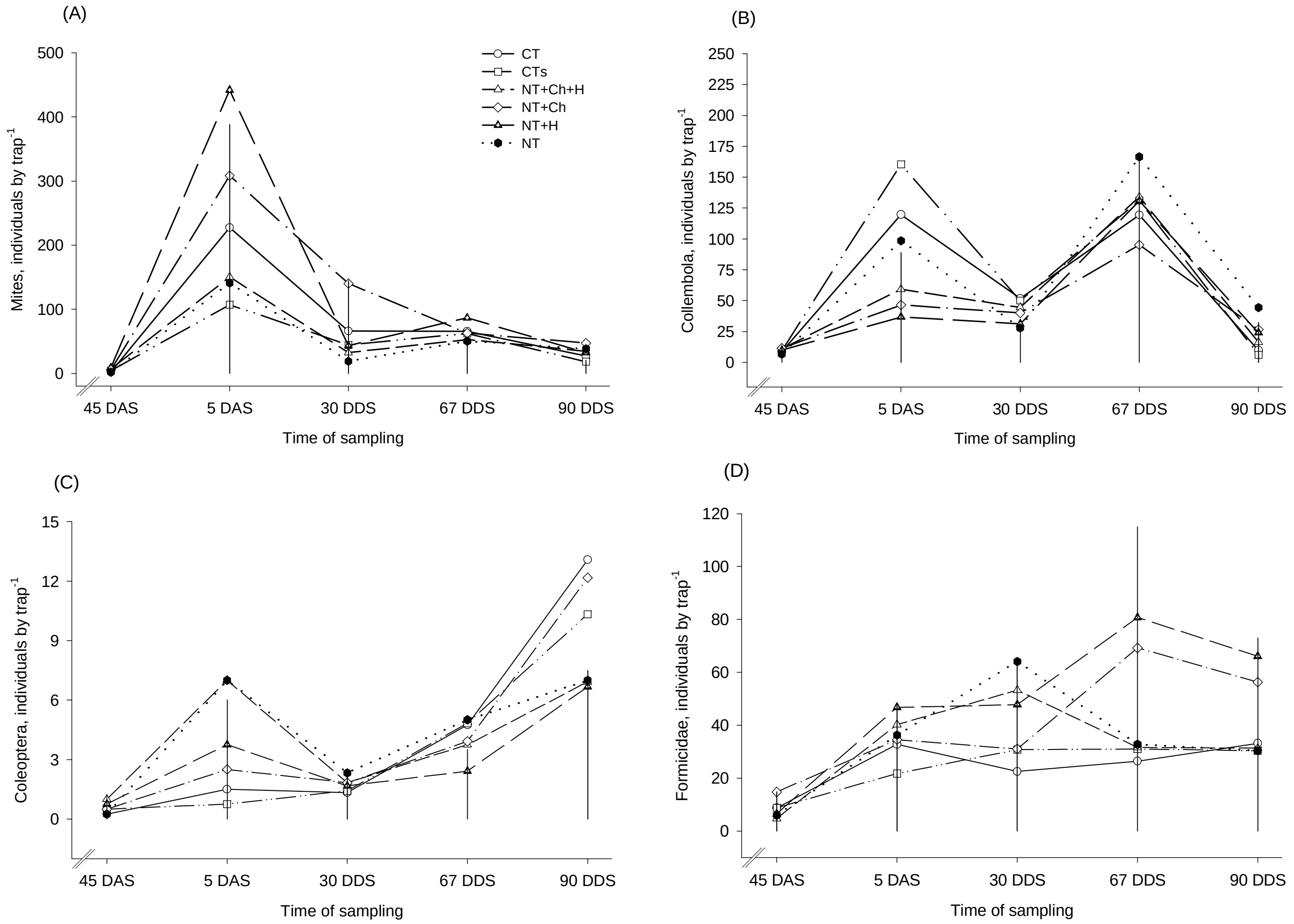

Figure 1. Populacional flutuation of Acari (A), Collembola (B), Coleoptera (C) e Hymenoptera (D) at 45 and 5 DBS (Days Before Seeding) and at 30, 67 e 90 DAS (Days After Seeding) in soil under different soil management (CT = conventional tillage; CTs = CT in strips; NT = no-tillage; Ch = chisel; H = herbicide). Vertical lines corresponds at LNT 5%. UFSM, Santa Maria – RS, Brazil, 2000/2001.

The sampling done at 45 DBS was preceded of a light drought occurred in July and August, plus the desycation and mowing of the natural grassfield, what took to the reduction in Acari population. According to Badejo and Tiam (1999), in the dry season, the abundance, diversity and population were smaller than in humid season. For the samplings performed during watermelon cycle, the reduction of soil covering in density and height, changing, probably, the temperature, soil water content and relative humidity of the air inside of vegetative canopy, provoked a reduction of Acari population, in relation to sampling done ate 5 DBS.

Collembola

For the Collembola population, the analysis of sampling data didn't accuse significant difference of soil management, as observed by Lima et al. (2000), except for the samplings done at 5 DBS and 90 DAS. Figure 1B shows Collembola populacional flutuation in different sampling times. The Collembola presented the second largest population among the studied organisms, with 57.64 individuals' average / trap / sampling. Again, similar to Acari, occurred significant effect of the sampling time on Collembola population, indicating that the climatic conditions occurred during the sampling period may have been the cause of the variation of its population.

Except for the sampling performed at 5 DBS and 90 DAS, in what happened significant difference in soil management, the behavior of Collembola population were similar for all treatments, with an increase accentuated in the number of individuals in sampling done at 5 DBS, where CTs presented larger Collembola population than NT+Ch+H, NT+Ch and NT+H. These systems probably presented higher soil density and lower total porosity, resulting in reduction of Collembola population due to increase in soil compaction, what was also verified by

Sautter and Santos (1991) and Hale (1971). There was reduction in the population at 30 DAS and an increase to 67 DAS, followed by a reduction to 90 DAS, what confirms the climate effect, as already related by Butcher, Snider and Snider (1971) and Granha (1999), with more accentuated effect in samplings at 45 DBS, 30 and 90 DAS, on the Collembola population (Figure 1B).

The previous occurrence of drought to the sampling done at 45 DBS, with accentuated reduction in soil water content, added to the reduction of density and height of the vegetation, because of mowing and desycation, may have contributed to the reduction observed in Collembola population. In the sampling done 30 DAS, the alteration of the microclimate due to reduction of black oat canopy and consequent changes in temperature, as related by Granha (1999) and surface soil water content, probably reduced the Collembola population. Another possibility is that it provoked their migration for deeper layers into soil profile, reducing the number of them moving in soil surface, resulting in smaller number collected by Tretzel traps, what was also verified by Böckl et al. (1998).

In the sampling done 90 DAS, the population of Collembola of CT and CTs treatments decreased, compared to NT population, agreeing with the data of Sautter and Santos (1991), but this didn't differ of NT+Ch+H, NT+Ch and NT+H.

Coleoptera

The analysis of sampling data for Coleoptera population of didn't accuse significant difference of soil management, except for the sampling done at 5 DBS.

There was significant difference among the times of samplings. Figure 1C shows Coleoptera populacional flutuation in different sampling times. It was collected 468 Coleoptera, with average of 3.90 individuals / trap / sampling. In the sampling done at 5 DBS, CTs presented smaller population of Coleoptera than NT+Ch+H and NT. This comes to confirm that black oat canopy in soil surface under NT increases the population of Coleoptera, as observed by Mortimer et al. (2002) and Decaëns et al. (1998).

Except for CTs, that stayed practically constant in the number of individuals in the sampling done at 5 DAS and of a light increase in the number of individuals in the sampling done at 30 DAS, followed by an increase accentuated in the number of individuals in the samplings done the 67 and 90 DAS, the behavior of Coleoptera population was similar to other treatments, with increase and reduction until the sampling done at 30 DAS and, starting from there, an increase in Coleoptera population. This indicates that the climatic and microclimatic conditions occurred during the sampling period, may have favored Coleoptera population, increasing its population during watermelon cycle, what confirms observations of Butcher, Snider and Snider (1971).

Hymenoptera

The analysis of sampling data for Hymenoptera population didn't accuse significant difference of soil management and the interaction soil management x sampling time, being significant the effect of sampling time.

Figure 1D shows Hymenoptera populacional flutuation in different sampling times. The analysis of data demonstrated that soil management didn't affect Hymenoptera population.

Hymenoptera, with 34.31 individuals' average / trap / sampling, were the third group in collected number. Hymenoptera population varied among sampling times, with an increase in number of individuals in the sampling performed at 5 DBS for all treatments. There was a tendency of increase (50%) and reduction (50%) of the treatments in the sampling done at 30 DAS, followed by increase in the number of individuals at 67 DAS for NT+H and NT, being reduced the population of the other treatments. In the sampling done 90 DAS, Hymenoptera population reduced for NT+H and NT, with a constant tendency for all other treatments. Hymenoptera population were not constant in sampling times for NT+Ch, with exception to the sampling done at 30 DAS. CTs had its population increased until the sampling done 30 DAS and after it stayed constant. In general, seemingly the climatic conditions, mainly the temperature, increased Hymenoptera population in relation to the sampling done at 45 DBS, what confirms the observations of Stork and Eggleton (1992); Granha (1999) and Butcher, Snider and Snider (1971).

Richness, Abundance and Simpson's Diversity Index of soil meso and macrofauna

In the Table 1, the statistical analysis of the richness data accused significant difference in the treatments in the samplings done at 5 DBS and 30 DAS. All the other comparisons didn't present significant differences. In the sampling done at 5 DBS the richness of soil fauna was smaller in CTs than in NT+Ch+H, NT+Ch, NT+H and NT, indicating clearly the direct effect of soil management, where conventional tillage with plow and disking reduced the number of orders of soil fauna, as observed by Badejo, Tian and Brussaard (1995) and

Badejo & Ola-Adams (2000). In the sampling done at 30 DAS the individual effect of soil management was similar, where the richness of soil fauna was smaller in CTs in relation to NT+H. Was evident NT superiority in maintaining a diversified soil fauna, because food is more abundant and diversified, as related by Gassen and Gassen (1996); Bianco (1997); Gassen (2000) and Hendges et al. (2000). The CT and CTs, in the samplings done at 67 and 90 DAS, for the fact that watermelon already had developed a reasonable soil cover, didn't show differences with treatments that involved NT.

Table 1. Soil fauna richness at 45 e 5 Days Before Seeding (DBS) and at 30, 67 e 90 Days After Seeding (DAS) of watermelon under different soil management systems. FUSM, Santa Maria – RS, Brazil, 2000/2001

Treatments[3]	Richness				
	45 DBS	5 DBS	30 DAS	67 DAS	90 DAS
	Order numbers				
CT	6.5 a*	8.2 ab	6.7 bc	6.8 a	7.9 a
CTs	6.0 a	7.0 b	6.5 c	7.3 a	8.1 a
NT+Ch+H	7.0 a	9.2 a	7.8 abc	7.3 a	8.4 a
NT+Ch	6.5 a	9.5 a	7.6 abc	7.7 a	8.6 a
NT+H	7.7 a	9.0 a	8.3 a	7.4 a	8.0 a
NT	6.7 a	9.5 a	7.9 ab	7.6 a	8.4 a
LSD[1] 5%	2.74	1.94	1.47	1.85	1.24
CV[2] %	17.67	9.64	14.91	16.11	14.68
Check Plot	-	-	7.1 a	7.1 a	8.1 a
Chemical	-	-	7.6 a	7.5 a	8.5 a
Ecological	-	-	7.7 a	7.5 a	8.1 a
LSD 5%	-	-	0.79	0.84	0.85

Means followed by the same letter in the column, do not differ by Tukey test (P=0.05). [1] LSD = least significative difference;[2] CV = coefficient of variation. [3] CT = conventional tillage; CTs = CT in strips; NT = no-tillage; Ch= chisel; H= herbicide.

Table 2 shows the abundance of soil fauna at different sampling times, under different soil management systems and under 3 systems of leaf diseases management in watermelon crop. The abundance of soil fauna didn't show differences among treatments in samplings done at 45 and 5 DBS and at 30 and 67 DAS.

In the sampling done at 90 DAS, CTs presented smaller abundance of soil fauna than NT+Ch, and the other treatments don't differ to each other. Probably, CTs presented smaller superficial water content in the soil than NT+Ch, as already observed by Badejo and Tian (1999).

In the sampling done at 67 and 90 DAS, the chemical management had larger abundance than check plot and ecological treatments, respectively, showing that applying or not the fungicide didn't reduce the abundance of soil fauna. The statistical analysis of data accused significant difference of the effect among sampling times for soil fauna abundance. Similar results were obtained by Ferri and Eltz (1998), in what the arthropods population was not altered by the herbicide glyphosate, independent of being or not mixed with the herbicide 2,4-D.

Table 3 shows the effect of soil management and leaf diseases management on Simpson's Diversity Index (SDI) at different sampling times, being significant the effect among times of sampling. This reinforces the hypothesis that the variation imposed to SDI was related to the climatic and microclimatic conditions occurred in the sampling periods, because soil fauna is sensitive to humidity and temperature changes, as well as food availability, as it was verified by SDI is based on the principle that a system is diversified when none of the species that composes it can be considered dominanter than any other one. For relatively diversified ecosystems it is equal or larger than 5, being 1 the minimum value and indicates no diversity (Gliessman 2000).

Table 2. Soil fauna abundance at 45 e 5 Days Before Seeding (DBS) and at 30, 67 e 90 Days After Seeding (DAS) of watermelon under different soil management systems. FUSM, Santa Maria – RS, Brazil, 2000/2001

	Abundance				
Treatments[3]	**45 DBS**	**5 DBS**	**30 DAS**	**67 DAS**	**90 DAS**
	individuals' sum of all orders				
-					
CT	32.7 a*	421.5 a	152.3 a	230.4 a	100.0 ab
CTs	29.7 a	307.3 a	136.3 a	227.5 a	78.2 b
NT+Ch+H	32.0 a	296.8 a	147.6 a	235.2 a	110.4 ab
NT+Ch	44.7 a	428.8 a	217.9 a	241.2 a	173.0 a
NT+H	36.7 a	591.3 a	138.1 a	311.3 a	151.2 ab
NT	20.5 a	314.8 a	130.2 a	263.0 a	142.7 ab
LSD[1] 5%	27.25	439.07	189.50	292.76	88.61
CV[2] %	36.22	48.60	76.12	62.1	44.30
Check Plot	-	-	132.3 a	163.7 b	116.2 ab
Chemical	-	-	151.5 a	312.5 a	152.3 a
Ecological	-	-	177.5 a	278.0 a	109.2 b
LSD 5%	-	-	82.58	111.26	39.36

* Means followed by the same letter in the column do not differ by Tukey test (P=0.005). [1] LSD = least significative difference; [2]CV = coefficien of variation t. [3] CT = conventional tillage; CTs = CT in strips; NT = no-tillage; Ch= chisel; H= herbicide.
Butcher, Snider and Snider. (1971); Madong and Nkolbisson (1999); Bracho et al. (1999) and Barros et al. (2001).

Table 3. Simpson's diversity index (SDI) of soil fauna at 45 e 5 Days Before Seeding (DBS) and at 30, 67 e 90 Days After Seeding (DAS) of watermelon under different soil management and leaf disease management systems. FUSM, Santa Maria – RS, Brazil, 2000/2001

	Simpson's diversity index				
Treatments[3]	45 DBS	5 DBS	30 DAS	67 DAS	90 DAS
	SDI				
CT	4.5 a*	2.6 a	2.8 a	2.9 a	3.8 a
CTs	3.5 a	2.5 a	3.0 a	2.8 a	4.0 a
NT+C+H	4.2 a	3.2 a	3.3 a	2.6 a	4.3 a
NT+Ch	4.2 a	2.1 a	2.9 a	2.7 a	4.5 a
NT+H	4.4 a	1.9 a	3.0 a	2.7 a	3.8 a
NT	3.6 a	3.1 a	3.2 a	2.3 a	3.9 a
LSD[1] 5%	2.66	1.43	0.64	0.82	1.50
CV[2] %	28.41	24.27	16.94	25.27	30.00
Check Plot	-	-	2.85 a	2.72 a	4.29 a
Chemical	-	-	3.12 a	2.71 a	3.88 a
Ecological	-	-	3.21 a	2.53 a	3.96 a
LSD 5%	-	-	0.3656	0.4737	0.8574

* Means followed by the same letter in the column do not differ by Tukey test (P=0.005). [1] LSD = least significative difference; [2]CV = coefficient of variation. [3] CT = conventional tillage; CTs = CT in strips; NT = no-tillage; Ch= chisel; H= herbicide.

Therefore, the results of Table 3, for different systems of watermelon cultivation, can be considered normal. SDI found in the sampling done at 90 DAS was similar to the sampling done at 45 DBS, showing that the alterations imposed to the natural field were overcome by the end of watermelon cycle, reestablishing a diversified fauna.

RESUMO: Um experimento foi conduzido em Santa Maria, RS, para estudar os efeitos de diferentes manejos de solo e doenças foliares sobre a fauna do solo. Os tratamentos foram: 1) Preparo conventional (CT) 2) CT com faixas sem preparo (s); 3) Plantio Direto (NT)+Escarificador (Ch)+Herbicida (H); 4) NT+Ch sem H; 5) NT+H e 6) NT. Todos os NT tiveram palha de aveia preta sobre o solo. As subparcelas tiveram os tratamentos de controle de doenças: 1) Testemunha, sem controle; 2) Químico, com fungicida; Ecológico, com uma mistura de "calda bordalesa" + "Supermagro" + "Alhol". Armadilhas deTretzel foram colocadas nas parcelas antes da semeadura e nas subparcelas durante o ciclo vegetativo da melancia. Amostragens foram feitas aos 45 e 5 dias antes e aos 30, 67 and 90 dias após a semeadura (DAS) da melancia. Cada armadilha ficou 4 dias no campo. Foram calculados a riqueza, a abundância e o índice de Diversidade de Simpson (SDI). A população de Acaros foi maior nos CT que NT+Ch e a população de Collembola foi maior nos CT que nos NT+Ch+H, NT+Ch e NT+H, antes da semeadura da melancia. Entretanto, a população de Collembola no CT e CT foi menor que NT aos 90 DAS. A população de Coleoptera foi menor nos CTs que nos NT+Ch+H e NT, enquanto a população de Hymenoptera não foi afetada pelo manejo do solo. O preparo conventional em faixas decresceu a riqueza nos 5 e 30 dias antes da semeadura da melancia e a abundância aos 90 DAS. Os tratamentos NT não afetaram a riqueza e a abundância. O manejo químico das doenças foliares aumentou a abundância. O Índice de Diversidade de Simpson não foi afetado pelo manejo do solo nem pelo tratamento das doenças foliares

PALAVRAS-CHAVE: Riqueza. Abundancia. Índice de Diversidade de Simpson. Plantio direto. Melancia.

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