DEPOSITION AND DECOMPOSITION OF LITTER IN MONOCULTURE AND CROP-LIVESTOCK SYSTEMS DURING SUMMER AND WINTER

DEPOSIÇÃO E DECOMPOSIÇÃO DE LITEIRA EM SISTEMAS DE MONOCULTIVO E INTEGRADOS DURANTE AS ESTAÇÕES DO VERÃO E INVERNO

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The senescent material of plant and animal origin deposited on the soil surface is called litter, which is important to provide nutrients that will be used by plants during the production cycle. Decomposition rate means the relationship between the material on the soil surface (existing litter – EL) and the litter that was deposited previously (deposited litter – DL). The objective of this study was to evaluate the amount of existing litter, deposited litter and the decomposition rate of litter in monoculture and crop-livestock systems, during summer and winter seasons. The experiment was conducted at the Institute of Animal Science in Sertãozinho, Sao Paulo state. The experimental treatments (designed in randomized blocks) were: corn (C), palisade grass (G), corn and palisade grass seeded simultaneously (CG), corn and palisade grass seeded simultaneously plus herbicide (CGH), corn and palisade grass seeded at corn top dressing fertilization (CGT), and corn and palisade grass seeded in the row and inter-row of corn plus herbicide (CGL). All treatments were implemented in December 2015. In all treatments except for the C there was continuous grazing of beef cattle. Existing litter (EL) was monitored at 28-day intervals by sampling quadrants (0.5 × 1.0 m), which were randomly positioned in the paddocks (four samples per paddock). The place where EL samples were collected was demarcated for deposited litter (DL) collection 14 days later. During the summer and winter, the collection procedure was repeated four times. The interval between collections was 28 days. The samples were sent to the laboratory for drying in an air circulation oven for 72 h at 65 ^{o}C and weighing. The decomposition rate (k) was calculated based on a single exponential decay function derived from the equation $K = -\ln[(Xeq - X_N) / Xeq] / t_N$, where Xeq is the LE, Xn is the LD and t_N is the time (14 days). Statistical analyses performed using the PROC MIXED routine of SAS®. EL averages in the summer ranged between 139 g m^{-2} (G) and 312 g m^{-2} (C). During the winter, EL averages ranged between 162 g m^{-2} (CGT) and 440 g m^{-2} (C). On average, all the treatments during the winter presented higher amount of EL and DL compared to the summer ($P<0.0001$), which can be explained by lower temperatures and lack of rain, resulting in pasture senescence. The greater amount of EL in treatment C, in both seasons, can be explained by the higher accumulation of straw after the corn harvest. There was no DL during both seasons in treatment C, which can be explained by the absence of animals, since animal trampling influences the litter decomposition. There was no significant difference in decomposition rate between treatments and seasons studied, which can be explained by absence of rain and atypical temperatures in the summer. The results suggest that the season of the year, type of system (monoculture or integrated) and probably the rate of animal stocking influence the amount of existing and deposited litter. Additional studies are needed to understand other factors that influence litter presence and decomposition, since this will be directly related to the nutrient cycling in the system and, consequently, the productive and economic results.

Keywords: Corn, palisade grass, integrated systems

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