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# Nordic Association of Agricultural Scientists —



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**Pest, disease and weed  
management in strawberry –  
progress and challenges for the  
Nordic production**

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## **Organic mulches compared to black plastic in organic strawberry production: effects on ground beetles**

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In organic strawberry production alternative organic mulches are considered as more preferable than plastic materials. Among many other effects mulches affect on ground dwelling arthropod community. Majority of ground beetles (Coleoptera, Carabidae) live on ground hunting various invertebrates for prey, therefore we investigated among other things if ground beetles show any preference for different mulch materials.

Seven types of mulches, black plastic, cut grass, barley straw, buckwheat husks, mixture of pine woodchips and buckwheat husks, birch woodchips, and pine woodchips were compared in a four-year organic strawberry experiment. Ground dwelling arthropods were sampled using pitfall traps in May-September 2002 and 2003, the third and fourth year of cultivation. Traps were examined weekly in 2002, and in 2003 traps were placed for five one week periods in rows of all mulch treatments and in row spaces where short cut red fescue - sheep fescue grass was grown. The aim of the samplings was to detect the influence of mulches on numbers and composition of predatory species to evaluate possible beneficial effects of mulches in means of plant protection. Adult ground beetles were identified, larvae were ignored. Differences of carabid richness between mulches were analysed, and Shannon H' biodiversity indices were calculated.

There were no significant differences in the numbers of ground beetle species or in the pooled numbers of beetles between the treatments in either season. Total of 4295 adult carabid specimens were trapped, and 63 species were identified. The most common species were *Clivina fessor*, *Dyschirius globosus*, *Patrobis atrorufus*, *Pterostichus niger*, *Bembidion properans*, *Pterostichus melanarius*, *Bembidion lampros*, *Pterostichus crenatus*, *Trechus secalis*, and *Amara communis*. These ten species composed 76% of the total number of specimens in 2002. Significant differences in preference of several species between mulches were detected. The big *Pterostichus* species were significantly more abundant in all mulched rows than in row spaces. These species are considered as beneficial predators of slugs and they are known to prey also wingless root weevils which are serious pests of strawberry.

Predator size reflects in prey consumption and general predatory effect, and therefore we calculated introductory prey consumption coefficients based on species size (length and width). These preliminary coefficients varied from 1 (the smallest species *D. globosus*) to 49 (*Carabus nemoralis*). The order of mulches arranged using these coefficients referring to a certain predatory buffer effect in different mulches was as follows: buckwheat husk (4.3), black plastic, cut grass and mixture of pine woodchips/buckwheat husk (3.2), pine woodchips (2.5), barley straw (2.3), birch woodchips (1.6) and row space (1.0). In buckwheat husk mulch the predatory buffer effect was supposed to be 4.3 times higher than in row spaces without any mulch.