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Environmental impact on sheep pastured in some polluted areas of Sardinia island: preliminary results with SCE-test

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Sardinia is the second largest island in the Mediterranean sea. Although it is famous for very beautiful landscapes not only along the coast, there are some polluted areas. A special project supported by the Sardinian Region and involving several research groups is trying to study these areas by using several approaches. In the present study, we report the preliminary results obtained from six sheep herds (Sardinian breed) grazing on natural pasturelands in the vicinity of possible polluted areas. Two herds were located in the Northern area (industrial and military zones) and four herds were located in the Southern area (military, industrial and mine zones) of the island.

Peripheral blood samples were collected from 20 adult sheep (over 4 years) randomly selected from each of six herds grazing around above mentioned areas, as well as from three herds grazing in areas retained far from possible polluted areas and used as control. Two types of cell cultures were performed: without (normal cultures) and with addition of BrdU during the last 28 h: the former, to study the AC-test (chromosome and chromatid breaks), the latter for the SCE-test. In this report only data from SCE-test are reported. A total of 92 sheep from polluted areas and 37 sheep from control areas were studied. Upon 35 cells studied for each animal, SCE-mean values were 8.65 ± 3.40 , 8.10 ± 3.50 , 8.05 ± 3.08 , 7.42 ± 3.34 , 9.28 ± 3.56 and 8.38 ± 3.29 in the exposed areas, as well as 7.86 ± 3.31 in the control group. Significant increasing ($P < 0.01$) of SCEs were found only in three areas of Southern area. Cytogenetic analyses using AC-test on the same animal groups are in progress.

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Chromosome stability in Agerolese cattle heterozygous for rob(1;29)

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Agerolese cattle is an autochthonous endangered breed reared in Campania region included in the RARECA project of protection and safeguard (PSR Campania 2007–2013—Misura 214). Rob(1;29) has been found in several Italian autochthonous breeds with very different frequency ranging from 0.9 % in the Grey Alpine and 23.3 % in the Cinisara. In the present study, five Agerolese cattle (4 females and 1 male) heterozygous carriers of rob(1;29) (group 1) and nine Agerolese cattle (7 females and 2 males) with normal karyotype (control group), reared in different farms, have been analyzed to assess chromosome stability by SCE test using peripheral blood samples. Mean values of SCE/cell were 6.34 ± 2.72 and 5.44 ± 2.50 in group 1 (carriers) and control, respectively being the difference statistically significant ($p < 0.05$); mean values of SCE/X chromosome were 0.45 ± 0.67 and 0.27 ± 0.59 in group 1 and control group respectively being the difference statistically significant ($p < 0.05$); mean values of SCE in t1 and t29 were 0.22 ± 0.47 and 0.02 ± 0.15 , respectively. The mean value of SCE/cell in the control group (5.44 ± 2.50) is almost comparable with the one earlier found in Agerolese cattle breed showing that, despite the selection programs currently carried out, no changes in genome stability have been occurred. Although mean number of SCE/cell is higher in Agerolese cattle carrying rob(1;29) than in the control, the observed SCEs number (42) on the rob(1;29) was considerably lower than those expected (72) on the basis of relative chromosome length. On the contrary, the SCEs number observed in the X (78) was much higher than expected (51.07). At the moment