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The global climate is changing and will continue to change in the near future. Increasing surface temperatures, sea water levels and changes in the intensity and precipitation are to be expected. Both changes in distribution and intensity of rainfall affect crop growth and soil trafficability and workability. Agriculture is sensitive to short-term changes in weather and to seasonal, annual and longer-term variations in climate. For the long-term changes, agriculture is able to tolerate moderate variations in the climatic mean. Changes beyond these bands of tolerance may require appropriate management practices, which are tailored to the climate variability of the region, such as: changes in cultivars and crops; use of suitable machinery, in terms of axle load, tyre size and inflation pressure; optimal time of sowing and tillage; or conversion to different land uses, such as minimum or zero tillage.
In this study the results of field tests carried out in a farm near Rome (41°52'33.41"N 12°13'12.58"E) on sandy clay loam soil are reported. The purpose of this study was to take in examination the effects on soil of two work site layout, working at different soil water content, both composed by a forage harvester with maize attachment and a truck for unload and transport of the harvested maize. The first work site coded (A), operated at soil water content of 15 kg 100 kg-1, the total mass of the harvester machine was 15600 kg and the theoretical ground contact pressure exerted by front and rear tires was respectively 106 and 145 kPa. The second work site coded (B) operated at soil water content of 37 kg 100 kg-1, the total mass of the harvester machine was equal to 11140 kg and the theoretical ground contact pressure exerted by front and rear tires was respectively 85 and 91 kPa. Immediately after harvest operations, such effects have been quantified through variation of some soil parameters: soil water content, penetration resistance (CI) shear strength (SS). Soil sampling have been carried out on the tracks left by the machine, on the track left by the truck that flanked the harvester machine and on soil not interested by the pass (Control).
For the work site coded A, penetration resistance results in the different layers, from 0 to 0.4 m depth, after the single passage of the harvest machine and the truck, showed statistically significant differences respect to the control in the surface layers (0-0.20 m depth) only the truck passage has affected the layer (0.21-0.30 m depth) and no differences were found in deeper layer (0-0.40 m depth). For the work site coded B, penetration resistance results showed statistically significant differences respect to the control in all layers (0-0.40 m depth).
Shear strength results for the work site coded A showed statistically significant differences respect to the control. For the work site B all difference respect to the control were significant, in this case the difference between the truck and the harvester was also significant. The results showed as the work site B, even if it was utilized a lighter machine exerting with a lower theoretical ground contact pressure, has mostly influenced soil parameters (CI and SS) in all examined layers, with respect to the work site A. In conclusion, this results show that in these field tests, soil moisture content was one of the most important factor influencing soil compaction processes because causes a reduction in the load support capacity of the soil and decreasing the permissible ground pressure. Standing the changes in intensity and distribution of rainfall, the soil water content during this operation could be every time higher, increasing level of soil compaction. Is therefore needed a good management practice in terms of right time of tillage, appropriate machines characteristics, controlled traffic and deep ripping for eliminating soil compaction

destroying hard pans and ameliorating hard setting soils.

Key words: Physical-mechanical soil parameters, harvester machine, truck, maize.

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