Soil ecosystem has high biodiversity interacting in complex relationships between food web organisms and abiotic factors. Land use changes and soil pollution negatively affect to soil biodiversity that perform an important role in the soil functionality and productivity, so researchers are making significant efforts to identify chemical, physical and biological indicators to assess the soil quality condition [1,2]. Different taxonomic groups arise as bioindicators [3], but highly qualified expertises taxonomists are required. The hierarchical study of soil fauna is recommended because provides an ecological approach, and is feasible to more researchers thus it requires less taxonomical resolution and might develop quality indexes [4, 5]. Moreover the new multivariate model-building techniques provide a robust tool to study the complex relationships among biota and soil characteristics [6]. Following with of our ongoing [7, 8, 9], we evaluated the effect of agricultural practices on soil biota using a hierarchical organisms classification. Multivariate statistical analysis using the Stochastic Boosting algorithm model [10] was determined the predictive importance of biological variables. Moreover a Soil Quality index [QBS$_\text{exp}$] was developed expanding the Parisi's QBS index [5].

Soil respiration [11] was used to evaluate microorganisms activity, and micro, meso and macrofaune was classified following rules of Kevan's [12]: Transient, Temporary, Periodic and Permanent fauna [based on their life cycle and degree of presence in soil], moreover we used Ferris's nematode classification [13]: Enrichment, Basal and Structured fauna [related with the degree of nematode stability] and collemobolan were classified using their ecological group: uedaphic, hemiedaphic and atmobios as their deep soil-living forms. On these bases we observed that soil biota sensitively response to agricultural practices intensity. Agricultural practices reduced soil respiration. Nematode structured fauna was related to natural areas and organic, orchard crops, whereas populations of nematode enrichment fauna increased with agricultural management intensity. Moreover, the hemiedafic collemobolan and periodic macrofauna was also negatively affected. After Stochastic Boosting analysis we show that soil respiration was the most important predictor variable followed by enrichment and estructured nematode fauna with 90 and 86% respectively. The best predictor from mesofauna were the pull of periodic organisms as………………………………..[85%] and eudaphic and hemiedafic collemobola with 79 and 75% respectively. Temporary and Periodic organisms from macrofauna were the best predictor variables with 73 and 70% respectively [Figure 1]. The QBS$_\text{exp}$ index proved their utility to describe soil quality taking higher values in natural areas and in organic
management than in conventional management resulting the most aggressive the vineyards and horticultal crops in conventional management [Figure 2].

![Image](image.jpg)

**Figure 1** Importance of predictor biological variables

**Figure 2**

### Acknowledgements

Authors thank to Dr. Carlos Simón (Departamento de Biología, Facultad de Ciencias, UAM) and Raymundo Outerelo (Departamento de Zoología y Antropología Física, Facultad de Ciencias Biológicas, UCM) for identification of collembolan and staphilinids. This research was supported by Ministerio de Educación y Ciencia (Grants: CICYT, REN2002-02550/GLO), Unión de Agricultores y Ganaderos de La Rioja–Coordinadora de Agricultores y Ganaderos (UAGR–COAG) (Grant: 2001/2001250).

### References


