PAULOWNIA TREE PLANTING IN SARDINIA (ITALY) AND ITS EVALUATION FOR AGROFORESTRY SYSTEMS AND SUSTAINABLE LAND USE

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Introduction
It is known that agroforestry is the integration of trees, crops and livestock on the same area of land and can be applied to all agricultural systems by planting trees on agricultural land or introducing agriculture in existing woodland (Paris et al., 2003). Sardinia (Italy) has a traditional heritage of agroforestry systems and an high potential value for innovative modern agroforestry systems that include environmental strategies and sustainable land use too. For example, planting Paulownia trees could be a beneficial system leading to a low carbon and high biomass productive agriculture in short time, with other specific ecosystems services included flood mitigation, reduction of diffuse pollution and soil erosion, protection of crops and livestock against climatic hazards due to climate change, integrated habitat network and landscape amenities. For these main objectives it appears an essential prerequisite to identify good practices operating in different situations from specific cases. So this work reports about the establishment and the development after two years of a Paulownia trees plantation in a large and homogeneous agricultural area, representative as a test site for climate, soil and land use characters, in Campulongu locality, in the countryside of Oristano, Central Sardinia, Italy (Fig. 1).

Materials and methods
The case study concerns a plantation of Paulownia tomentosa (Thunb.) Steud. established during the autumn of 2009 on agricultural lands, partially covered by mediterranean vegetation dominated by Cistus spp. After the harvesting of vegetation and an intensive cultivation of soil with mediterranean crops, the plants (140 bare rooted seedlings) were placed with spacing 3 x 2.5 m (between and within rows respectively) with density of 1333 p ha⁻¹. The observations on the survival and some phenotypic traits of trees after two growing season (Figg. 2-3) were collected on four random plots regarding as total more than 1 hectare. The data were compared with as much as reported on literature (Calvo & De Bonis, 1999; Mezzalira, 2001; Yungying & Zhaohua, 1997).

Results
The results are reported in Figg. 4-5-6. The mortality was 22%, the average value of basal diameter was 4.4 cm and the average height was 2.1 m (Tab. 1). These first results showed that the role assigned to Paulownia trees can be a beneficial system leading to a low carbon and high biomass productive agriculture in short time. Data collection of recurrent monitoring will be basic to confirm this role also in the future.

Fig.1

Fig.2
Fig.3

Fig.4
Fig.5

Fig.6

Tab.1

<table>
<thead>
<tr>
<th>Average values of surveyed parameters</th>
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<tr>
<td>Density (p ha⁻¹)</td>
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References