INTRODUCTION
In Mediterranean grazed woodlands, microclimate changes induced by trees influence growth and development of the understory but very little is known on its phenolic composition under full sunlight or shade. Phenolic acids, flavonoids and tannins are the most important compounds for biological activities and especially antioxidant properties and related implications in animal nutrition and welfare (Piluzza et al., 2013).

OBJECTIVE
The research was carried out in a cork oak agrosilvopastoral system in Sardinia, where we investigated the bioactive compounds and antioxidant capacity of different legume-based swards subjected to variations in light intensity.

MATERIALS AND METHODS
A field experiment was carried out during 2015-16 in a private farm (40°37′ 99″ N, 9°15′ 33″ E, elevation 700 m a.s.l.) located in North East Sardinia (Italy). The climate is Mediterranean with hot dry summer, long-term rainfall is 846 mm and average annual temperature is 12.7 °C.

The area is characterized by extensive agro-silvopastoral systems, inside a representative Mediterranean evergreen cork oak woodland with tree density of 450 trees ha⁻¹.

RESULTS AND DISCUSSION
Antioxidant capacity, TotP and TotF of forage were significantly affected by light intensity, as well by the type of legume-based swards.

Compared to full sunlight, partial shade reduced antioxidant capacity values by 28 and 42% and TotF content by 23 and 53% in Fertiprado (L100 mix) and semi natural pastures (L60SNPA) (Fig. 1).

Twelve phenolic compounds were detected: neochlorogenic acid, chlorogenic acid, rutin, verbascoside, 1,5-di-O-β-D-glucuronide (3,5-DGCQ), xerogonin, loricentin, p-cumaric acid, luteolin-7-O-glucoside, luteolin, quercetin, and gallic acid.

Verbascoside in bladder clover mixture was the most abundant in full sunlight and neochlorogenic acid and xerogonin were abundant in partial shade in CNR ISPAAM mixture (L300G MIX) and in unsown semi-natural pasture (L60SNPA), respectively (Table 1).

The presence of verbascoside has not been reported in other HPLC studies on clover species so far. The effect of verbascoside administration on plasma oxidative status and specific blood and milk production parameters was evaluated in Lacaune ewes (Casamañas et al., 2012). Verbascoside provided benefits in terms of blood parameters, oxidative status and milk production.

CONCLUSIONS:
As antioxidant capacity and the content of bioactive compounds a determined in the legume-based swards could potentially affect the nutritional properties of forages; their variations caused by contrasting light intensities thus represent a particular benefit, which must be exploited as an additional service from agroforestry.

Table 1. HPLC analysis of polyphenolic compounds (g kg⁻¹ DM) from shoot of legume-based swards growing in full sunlight (FS) and partial shade (PS)

<table>
<thead>
<tr>
<th>Compound</th>
<th>FS</th>
<th>PS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neochlorogenic acid</td>
<td>1.44</td>
<td>1.21</td>
</tr>
<tr>
<td>Chlorogenic acid</td>
<td>0.45</td>
<td>0.69</td>
</tr>
<tr>
<td>Rutin</td>
<td>0.16</td>
<td>0.34</td>
</tr>
<tr>
<td>Verbascoside</td>
<td>1.33</td>
<td>1.18</td>
</tr>
<tr>
<td>Neochlorogenic acid</td>
<td>0.21</td>
<td>0.23</td>
</tr>
</tbody>
</table>

Fig. 1. Antioxidant capacity (ABTS and DPPH) values, total phenols (TotP) and total flavonoids (TotF) in shoot of legume-based swards growing in full sunlight (FS) and partial shade (PS).