WP1. HERBAGE AND LIVESTOCK SERVICES

Released on May 2022

Samplings associated with herbage services are done at least twice a year, in the spring peak biomass (spring 2022 and spring 2023) and in autumn (autumn 2022 and autumn 2023).

Optimum cutting height:

Moist Mediterranean: when leading grasses are approx. 35 cm high in the shorter plot.

Dry Mediterranean: let the grasses and other fructify so they can reseed.

DO NOT WEED BY ANY MEANS; EXCEPTION: a cleaning cut (8-10 cm height) within 1-6 months after establishment if needed. However, please consult with the SUSFORAGE coordinator first, and record the date of the cleaning cut.

1. Determination of sown plant species and weeds

Sampling Design: 40 plots x 2 grazing treatments x 4-5 sampling events (2 per year)

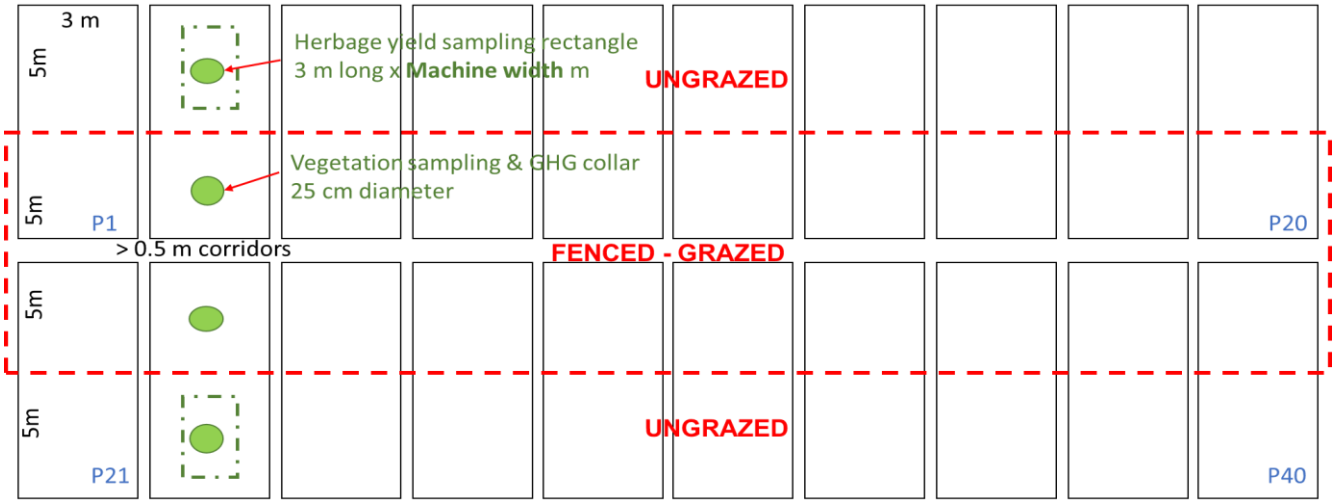

Figure 1. Scheme of the showing plots dimensions and plot ID (1 to 40; corridors between plots; strip for yield measurement; and subplot for the determination of sown plant species and weeds (see an example in the picture).

- In order to follow the evolution of the different compositions sown in the plots, fixed PVC collars will be installed and sampled along the experiment (Figure 1).

PVC collars installation

- Buy PVC pipelines of 25 cm diameter
- Cut the pipeline into 80 collars (40 plots x 2 grazing treatments) of 8 cm width
- Go to the field and place 1 collar in the middle of each plot
- Hammer the collars 4-5 cm into the soil, so only 3-4 cm emerge
- Leave the collars in the field for the plant composition, weeds and, in some plots, the GHG sampling (**WP4_climatic_services**)

- The determination of sown plant species and weeds needs to be done before harvesting the entire field with machine.
- Cut by hand the vegetation inside the collars at 5 cm height (40 collars x 2 grazing treatments), store the samples in plastic bags and in coolers during the field campaign.
- In the lab, separate the vegetation samples into plant species. Plants not sown in that plot will be considered weeds.
- Plants can be stored in the refrigerator for some days. Samples that cannot be processed during the days after the sampling event can be frozen and processed later. However, it is highly recommended to process the samples fresh, not after freezing. This helps to the identification of plant species.
- Determine the dry weight separately per species in the collars, after dry-oven at 60ºC until constant weight (~48 h).
- Record the dry weight (g) of plant species in the **WP1_herbage_services** Excel file, **species template**. The total dry weight of the vegetation inside the collars will be added to the final calculation of the yield (Section 2. Herbage yield)
- Store the dry samples.

2. Herbage yield

Sampling Design: 40 plots x ungrazed treatment x 4-5 sampling events (2 per year)

- In the ungrazed treatment, cut by machine a strip of herbage inside each plot at 5 cm high for yield determination. The recommended minimum dimensions of the strip are 3 x 1.4-1.6 m (Figure 2). There can be some modifications in the width of the strip depending on the machine. Record the final dimensions of the strip in the **WP1_herbage_services** Excel file, **notes page**. Please, consult with the SUSFORAGE coordinator if you have questions about the dimensions of the strip.

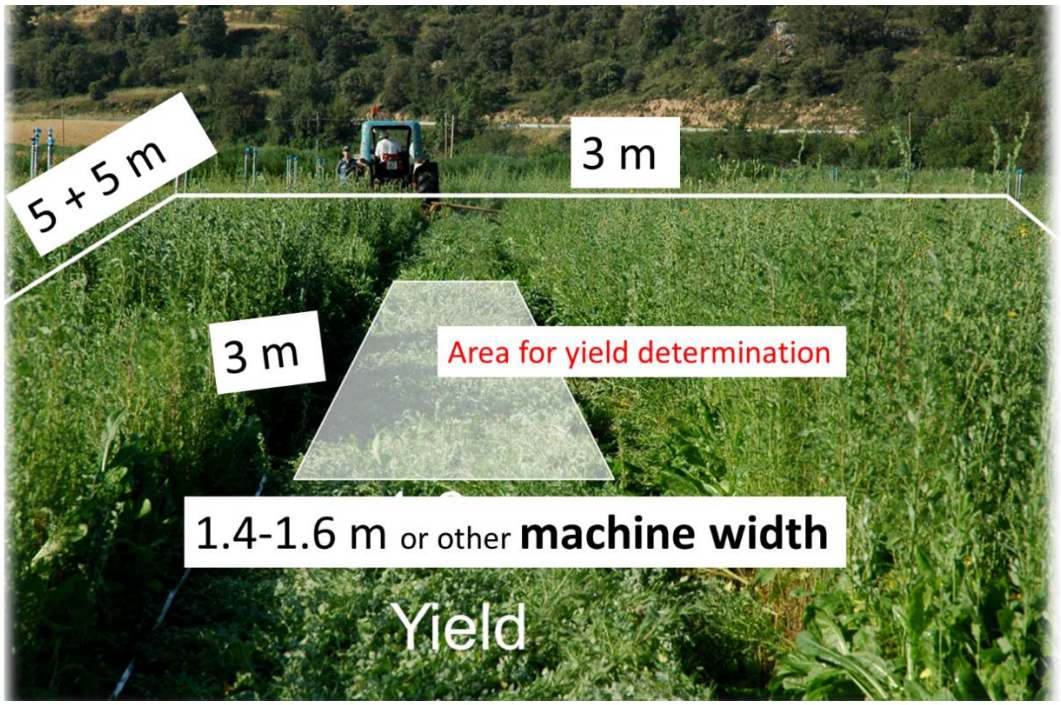

Figure 2. Example of plot cut for yield determination; fresh weight determined by dynamometer in the field.

- Rake the herbage of the strip of each plot.
- Determine the herbage fresh weight in each plot by a dynamometer and write down the weight in the field (Figure 3).
- Afterwards, record the fresh weight of the strip in the **WP1_herbage_services** Excel file, **yield template**.

Figure 3. Image of the raking process and weighing of the herbage for yield determination.

- Grab a good handful of herbage right after cutting the strip (at least 1 Kg), seal in plastic bags, squeezing out the air and closing, and store the sample refrigerated.
- In the laboratory, determine the fresh weight of the grabbed subsample, including the water in the bag, dry-oven at 60 ºC and until constant weight, and weight for dry weight. Record the fresh and the dry weight of the samples in the **WP1_herbage_services** Excel file, **yield template**.
- The ratio fresh weight / dry weight will be used to calculate the dry weight of the yield known the fresh weight of the strip.
- Reserve this sample for herbage quality analysis (Section 3. Forage quality).
- After harvesting the strips of all the ungrazed plots for yield determination, cut by machine also the margins, and the herbage inside the grazed treatment plots to homogenise the filed. Remove the herbage to “clean” the plots. You can use a rake or a harvester.

3. Forage quality

Sampling Design: 40 plots x ungrazed treatment x 4-5 sampling events (2 per year)

- Mill the dry samples by rotary mill (e.g. Brabender rotary mill) through 1 mm sieve.
- Pack approx. 100 g of dried sample in nylon bags.
- Label the samples as follows: experimental site code (ES, FR, SI, LB, JO) – date (yyyymmdd) - plot ID (1:40) – grazing (no). Example ES-20220622-40-no.
- Contact the KIS members and send the samples for NIRS analysis.