From sampling to determination: at which step the possible mistake?

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LAB

2005-2009 **FutMon** (ex CONECOFOR) level II plots foliar mandatory element analysis

Directly follow **Mg K Ca** and **P**

- Annual RT
- 3 sampling seasons

FIELD

Sampling and all the following steps: storage, oven dry, mill, etc.

LAB

From 2005 we made several change, some examples:

Digestion Open system (code 3.10) → Closed system (code 5.5);

Dilution Common dilution for all samples for each element → A suitable dilution for each (or group of) sample (hit by the sens. check) in order to maintain concentration within the linear working range.

Lab glassware Glass → Plastic

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We made an effort, we improved our work quality and, especially after the last RT, we reached results of better quality

LAB

BUT

We know that a sampling procedure not completely accurate induce an elevated risk to make any effort in the lab fruitless

FIELD

IV Sampling and Analysis of Needle and Leaves

"As trees must not to be felled, any convenient way of sampling, taking into consideration type and size of stands etc., is acceptable, provided that it does not lead to contamination of the sample, to heavy tree damage, or to risks for the sampling team"

The manual grants to the operators a large discretion about techniques and way of sampling

When trees are high

and in closed forests

→ **Tree-climbing**

Tree-climbing classic technique:

- Ascending on a rope tied on the tree, by:
  - dynamic knots
  - specific instruments (Speleo handle and Croll)
- Use of crampons only rarely on thick bark species (larch, oaks etc.)

Tree-climbing is the most reliable method to sample high trees

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This technique require elevated skills and a specific training

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If the operator is not a good tree-climber the foliar sample could be not completely conforming to the manual (e.g. upper third of crown, sun leaves)

The Italian approach

Since 2005 the CNR-IBAF created a team composed of an expert tree-climber and IBAF staff.

A small van enable the team to be completely autonomous concerning:

- Board and lodging
- Sample treatment (computer, scanner for SLA, inverter “are on board”)

It can assure:

- Low costs for the Institute
- Respect of sampling periods (fast and flexible organization)
- Low sample damage risks (only one hand from forest to lab)

In conclusion we think that is advisable

- To define at EU level a range of possible methodologies (for each forest type).

In cases where the sample is taken directly by site staff:

- To provide a field training course (as already done for crown transparency), illustrating the suitable methodology for their site;
- To suggest to samplers to follow a course to enable them to be legally authorized to operate on trees (in compliance with the regulations in force in each country);
- To provide assistance to permanently equip the plant, at an appropriate height, by professional tree-climbers, granting to the "*new*" tree-climbers (site staff) to safetly reach the upper third of the tree;
- If two bi-annual sampling are carried out from the local "*new*" tree-climbers on their own and one with assistance of a professional tree-climber the permanent equipment can be checked every 6 years.

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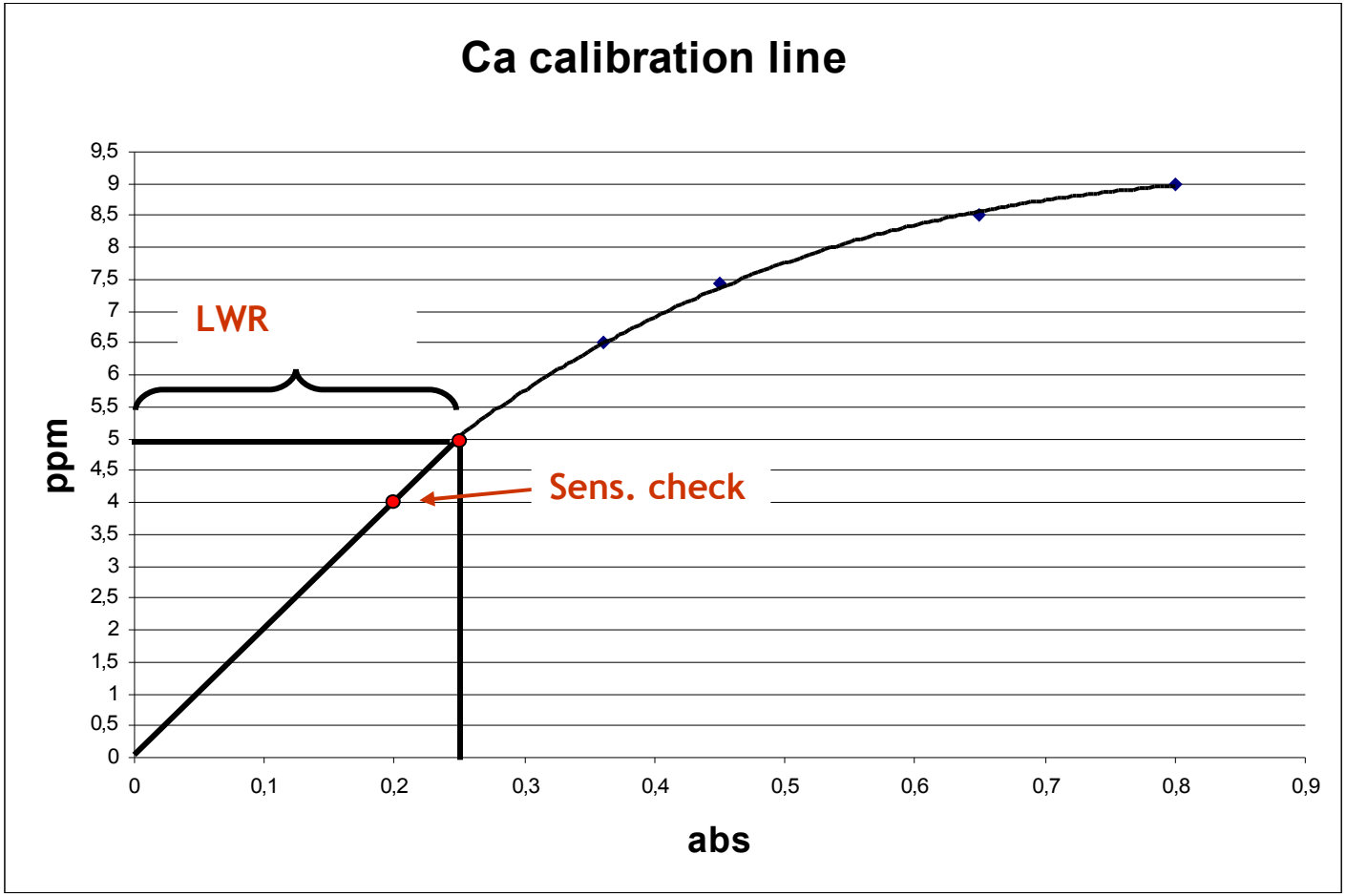
Thank you


Ca calibration line
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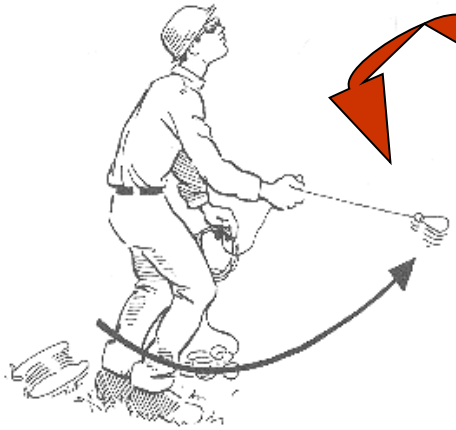
Some equipment

Speleo handle

Descender



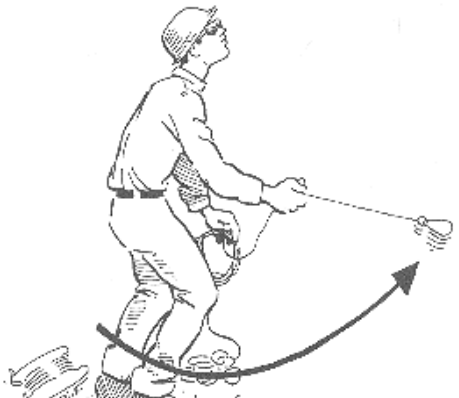
Throw weight

Climbing harness

Ascender

Harpoon

+



UP

UP

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we know that, for esample for Ca, a concentration of 4 ppm will typically give an absorbance reading of about 0,2 unit. If I don't have in advance the samples concentration I check their adsorbance and I dilute them in order to obtain absorbance values close to 0,2 units. Always considering Ca, as for this element the upper limit of the working range is 5 ppm, if my samples concentration is close to 4 ppm I'm quite sure that i'm working within the linear working range.