

# Progress in developing a potato ontology for breeders



## Introduction

The potato ontology is part of a community effort to establish a set of related crop ontologies. The advantage of an ontology is that both humans and software applications can understand a data domain. This will allow the application of numerical or data mining techniques that may help to uncover previously unknown correlations. Building on previous draft versions, here we focus on traits important to breeding: we identified so far 70 descriptors. These include: morphological (36), agronomical performance (7), resistance traits (7), biochemical (6), reaction to abiotic stresses (2), molecular (1) and post-harvest (9). We anticipate further refinements and cross-checks.

## Materials and method

The descriptors used in morphology (Gomez et al., 2000, 2010) and evaluations of materials were previously standardized (CIP 2012). As a starting point for focusing on traits relevant for breeders we used descriptors published in the Catalog of Advanced Clones by the International Potato Center (2014, Fig.1). We also cross-checked with the lists of characteristics in the description of potato varieties. (USDA form: OMB NO 0581-0055). We conducted comparisons of different ontologies available from the crop ontology site such as solanaceae, cassava and maize.

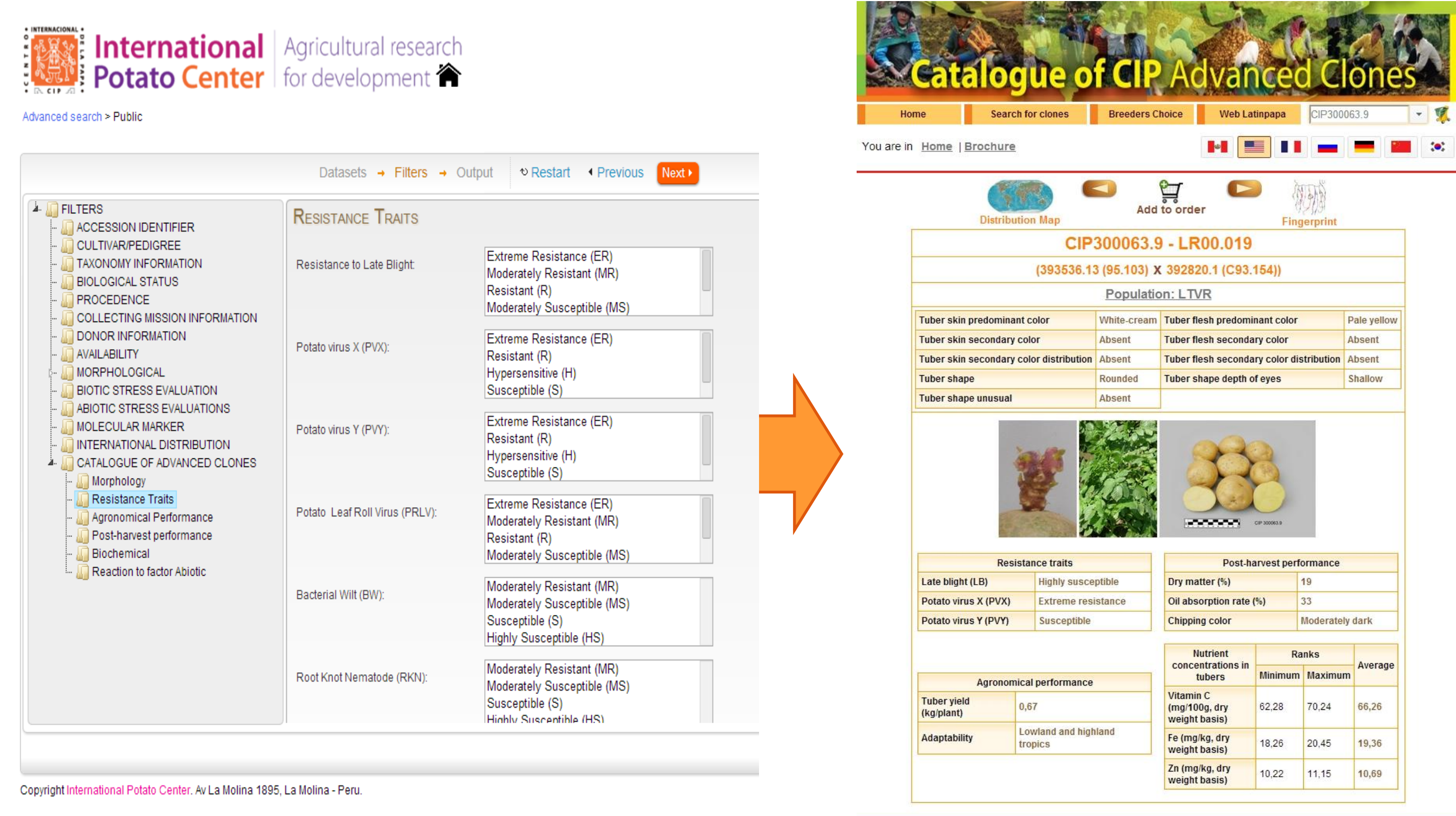


Figure 1: Hierarchical structure in BioMart and Catalogue web

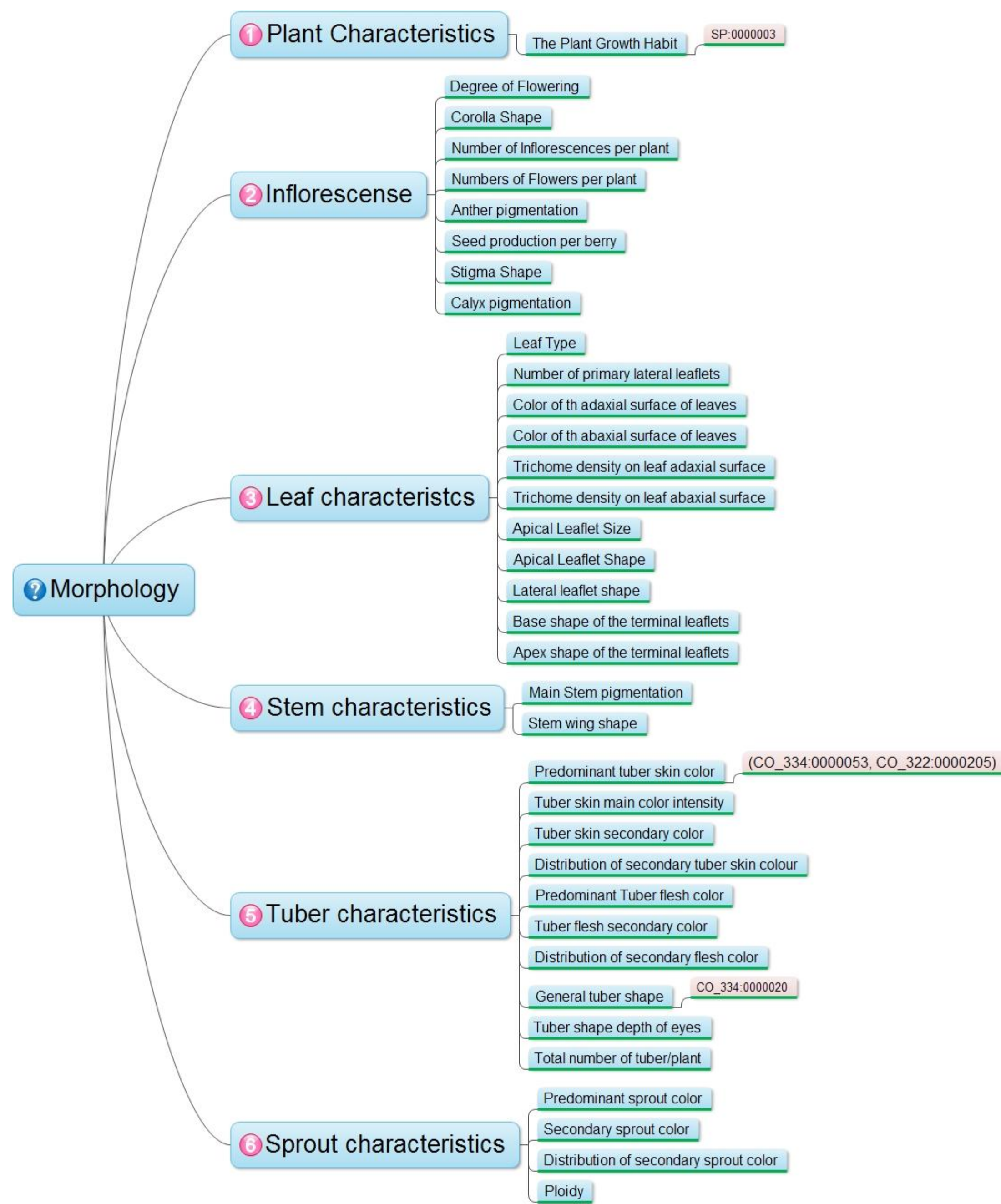


Figure 2: Main morphology descriptors of Potato

## Results and Conclusions

In this 2<sup>nd</sup> draft ontology of the potato we list 36 morphology descriptors, which are grouped into six subgroups: plant characteristics (1), inflorescence (8), leaf characteristics (11), stem characteristics (2), tuber characteristics (11), and sprouting characteristics (4) (Figure 2). For agronomical performance (7 descriptors) see figure 3, for resistance traits (7) see figure 4; for biochemical characteristics see figure 5 and for post-harvest see figure 6. Further cross-checking is pending.

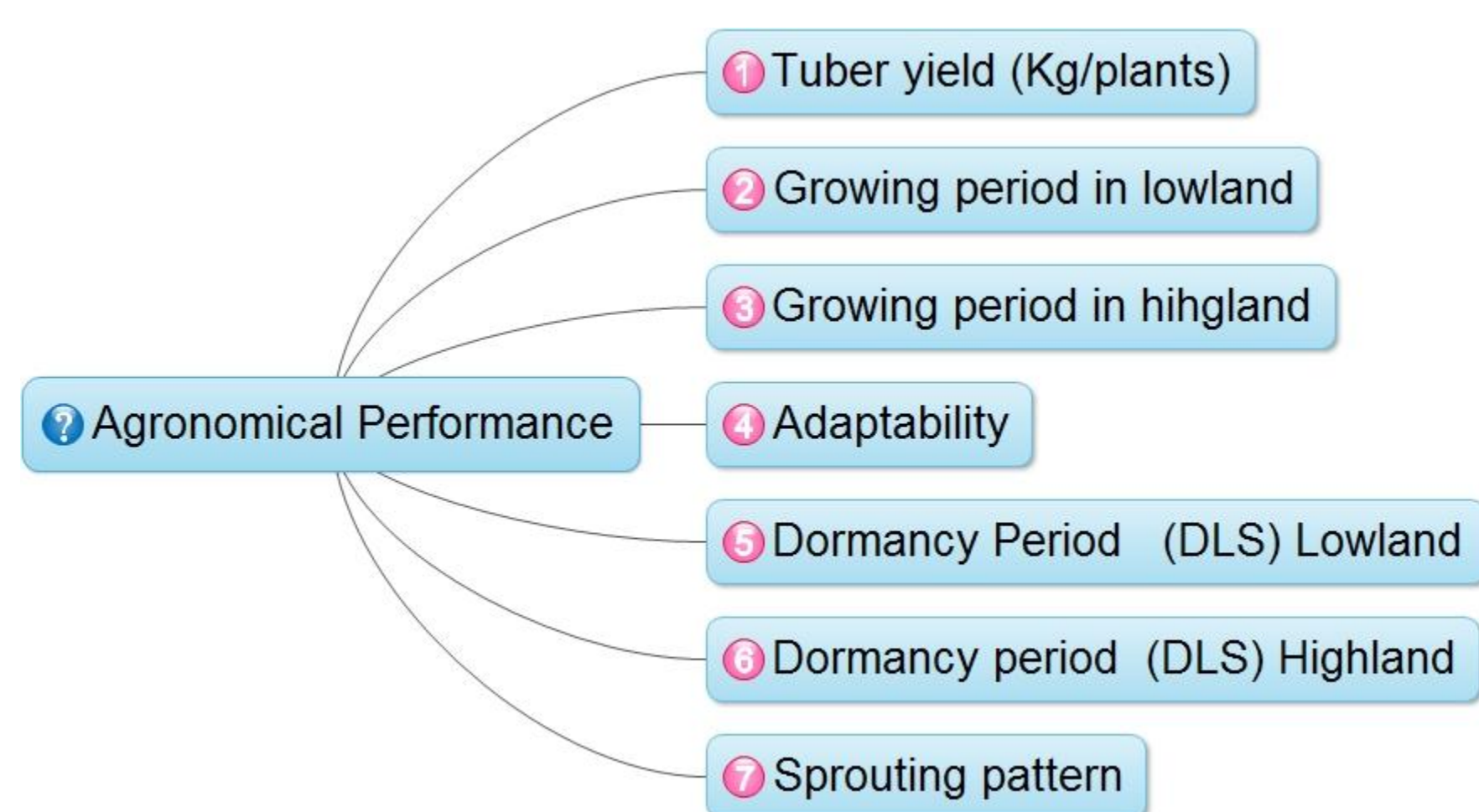


Figure 3: Descriptors Agronomical performance

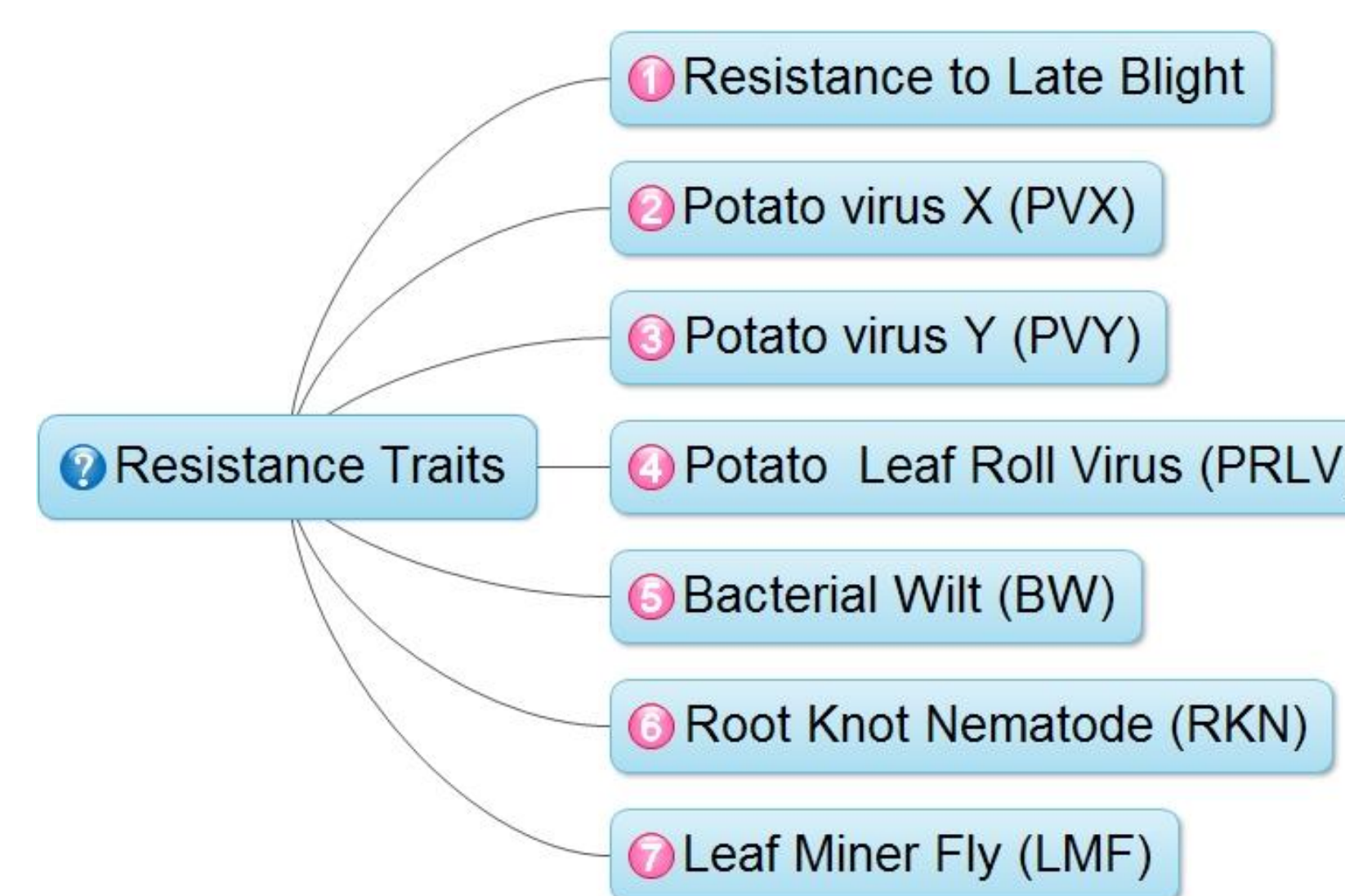


Figure 4: Resistance traits

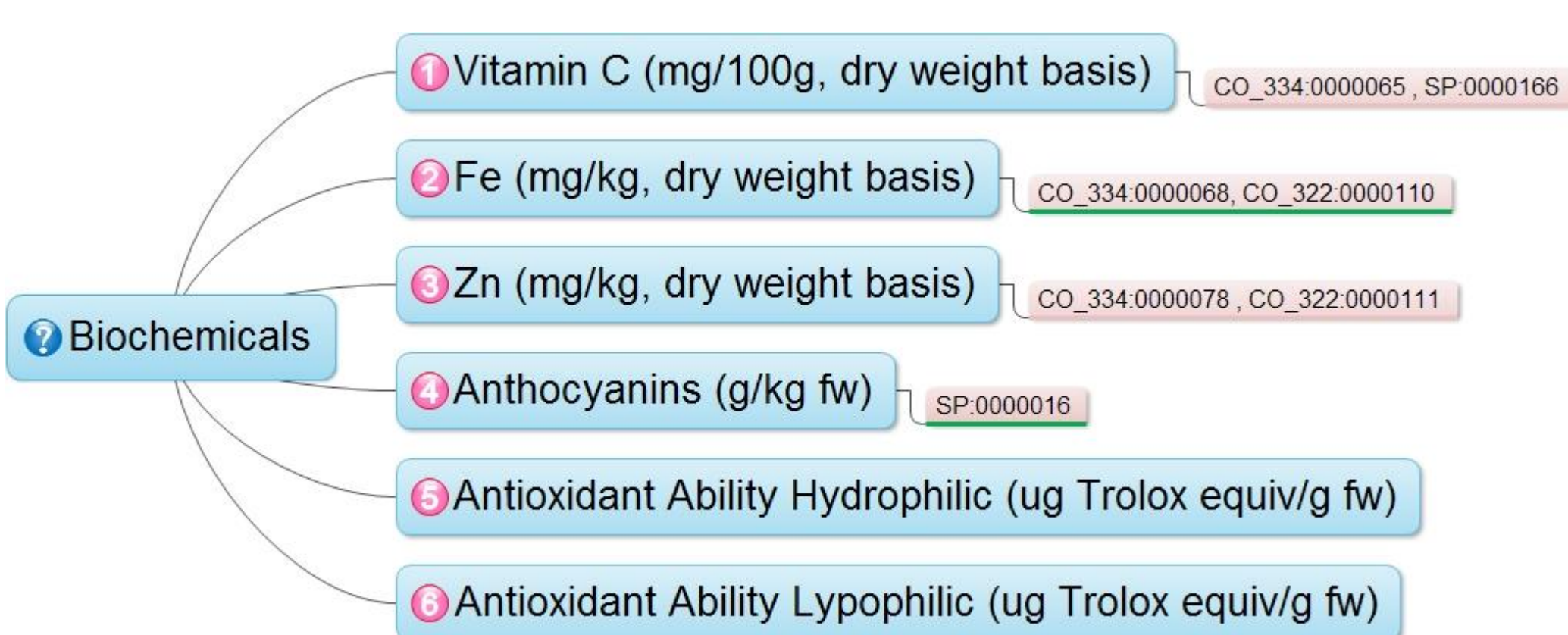


Figure 5: Biochemical Descriptors

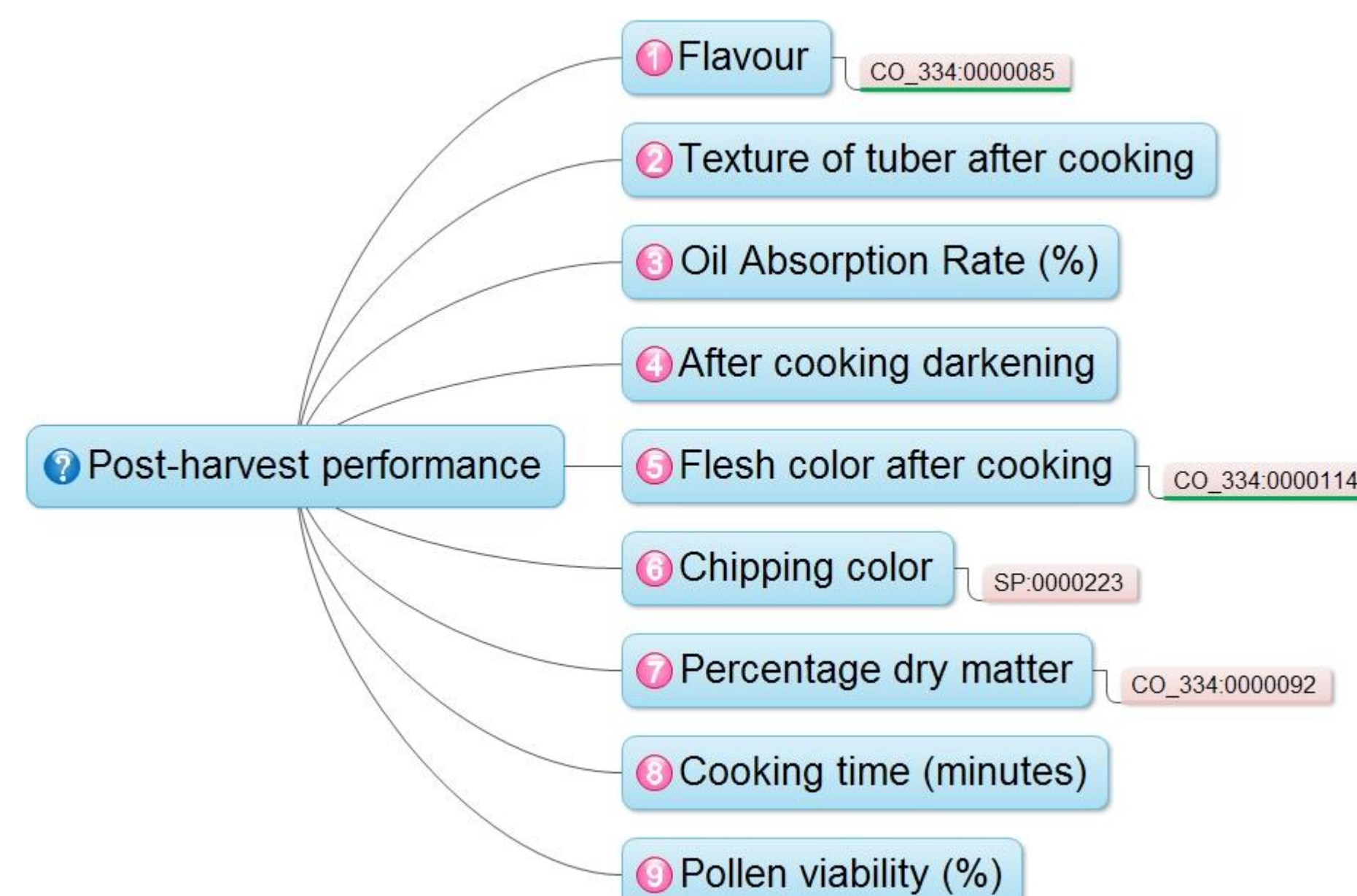


Figure 6: Post harvest performance

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 Ontology Solanacea on <http://www.cropontology.org>  
 Ontology Maize on <http://www.cropontology.org>

OMB NO 0581-0055 U.S. Department Of Agriculture Exhibit C Agricultural Marketing Service Science And Technology Plant Variety Protection Office Beltsville, Md 20705. Objective Description Of Variety Potato (Solanum Tuberosum L.)

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