Rationalization of a genebank cucumber collection with SSR markers

W. van Dooijeweert and R. van Treuren
Centre for Genetic Resources, the Netherlands (CGN), P.O. Box 16, 6700 AA Wageningen, the Netherlands

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Abstract

The CGN cucumber *(Cucumis sativus*) collection consists of 937 accessions. The majority of accessions originated from the working collection of the former Institute for Horticultural Plant Breeding (IVT), where they were used for breeding. The collection mainly includes old cultivars received from Dutch and foreign seed companies, and genebanks, but also contains landraces and accessions of the crop wild relative *C. hardwickii*.

Passport data were updated in 2002, and used to rationalize the collection.

In 2009, CGN participated in a project initiated by The Institute of Vegetables and Flowers of the Chinese Academy of Agricultural Sciences in Beijing (CAAS), China. The project aimed at developing a structured core collection of cucumber germplasm using well-distributed and highly polymorphic SSR markers. For this purpose, the collections of CAAS, of the USDA (United States) and of the CGN were used. A total of 3,318 accessions were analyzed with 23 highly polymorphic microsatellite (SSR) markers, resulting in a core set of 109 accessions (in preparation).

In addition to the collaborative project, the SSR data of 752 CGN accessions were analyzed separately in order to find further options to rationalize the collection based on these markers. A phylogenetic tree was constructed based on Jaccard similarity values. Four distinct groups could be recognized, i.e. *C. hardwickii*, landraces from South Asia, varieties from Asia, and varieties predominantly from Europe and USA. The SSR data were also used to verify passport data, such as origin country, and to improve accession documentation.

Twenty-seven groups of accessions with identical microsatellite profile were identified. Trials are planned to compare these potential duplicate accessions morphologically.

In the past, a "cucumber" group and a "gherkin" group were recognized within the collection, based on morphological traits. However, this division was not supported by the SSR data and therefore abandoned.

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