Scale Considerations in Mapping for Germplasm Acquisition and the Assessment of Ex Situ Collections

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Spatial data on habitats can guide as well as inform the selection of sites for plant germplasm acquisition and/or in situ conservation and the evaluation of accessions conserved ex situ (Guarino et al., 1999, see Chapter 1). They help in the search for target habitats, and can give a good overview of the conditions under which the populations represented in a collection were growing (Jones et al., 1997). Most plant genetic resource (PGR) workers use spatial data of some sort in their work, and most would forecast a substantial increase in the use of digital spatial data sets in the coming decade, as digitization reaches farther and more strongly across both geographic areas and topics of interest to germplasm conservation programs.

However, an intractable problem must be overcome. Most habitat factors that are important to PGR conservationists and users are far more intricate than can be mapped consistently across broad areas. The conditions that link habitat character to adaptive traits in germplasm are often so limited in spatial area that mismatches are found when comparisons are drawn using the extensive descriptors of map products. The following discussion will explore the implications of this mismatch, and will offer some conclusions dealing more with its acceptance than its solution.

Closely associated with this mismatch are the ongoing changes in the nature of map quality and in the meaning of scale, particularly with respect to the size of depiction and the inconsistency with which map data are delivered in an age of do-it-yourself digital mapping. A thorough review of the challenges of map scale in a digital world is provided by Goodchild and Proctor (1997). Additional useful orientation to the field scientist’s perspective on issues of scale can be found in Carlile et al. (1989) and Turner et al. (1989).

This chapter will examine considerations of scale by way of the opportunities and constraints presented by a specific field exploration and a series of subsequent analyses of both new and long-established collections. The examples are drawn from products prepared for the 1995 West Caucasus Collecting Expedition (Fig. 4–1), a collaboration between the U.S. Department of Agriculture (USDA)