Structural differentiation of Kranz Anatomy in *Digitaria sanguinalis* and *Setaria viridis* (C-4 Poaceae)

InSun Kim
Biology Department, Keimyung University

Structural differentiation of Kranz anatomy has been investigated in leaf sections of two C-4 Poaceae: *Digitaria sanguinalis* and *Setaria viridis*. The study mainly focused on cellular and interfacial features of the bundle sheath (BS) and mesophyll (MS) cells of the C-4 structure. Prominent BS, spaced by only two MS cells apart, were surrounded concentrically by a layer of MS cells. BS cells of *S. viridis* had centrifugally arranged relatively large chloroplasts containing much starch, but the chloroplasts had agrana to rudimentary grana. Structural and size dimorphisms, when starch was present, were detected between BS and MS chloroplasts. Loosely arranged MS cells had peripherally displaced smaller chloroplasts containing little to none starch. BS chloroplasts of *D. sanguinalis* were similar to those of *S. viridis*, but had very little starch and well-developed long agranal stroma lamella. Features of MS cells were similar in both species, but well-defined peripheral reticulum (PR) was easily recognized in MS chloroplasts of *S. viridis*. Virtually no PR was was developed in BS chloroplasts examined. BS cells contained more mitochondria and microbodies, but no structural dimorphism was noticed. The electron-dense suberized lamella were often observed between BS and MS cells, especially in the primary wall of BS cells. It was most frequently found at the BS and MS cell interfaces and terminated in radial walls of the adjacent BS cells. Prominent pits with plasmodesmata (pd) were seen in the walls of both cells. There also were numerous pd in outer tangential walls of the BS cells. The number

of pd ranged from 20 to 60. The pd traversed a segment of cell wall much tinner than the adjacent wall. The current cellular data have been compared to the ultrastructural features known in leaves of other C-4 plants, especially those of the NADP-ME species.

Keywords: C-4 Poaceae, *Digitaria sanguinalis*, *Setaria viridis*, Kranz Anatomy

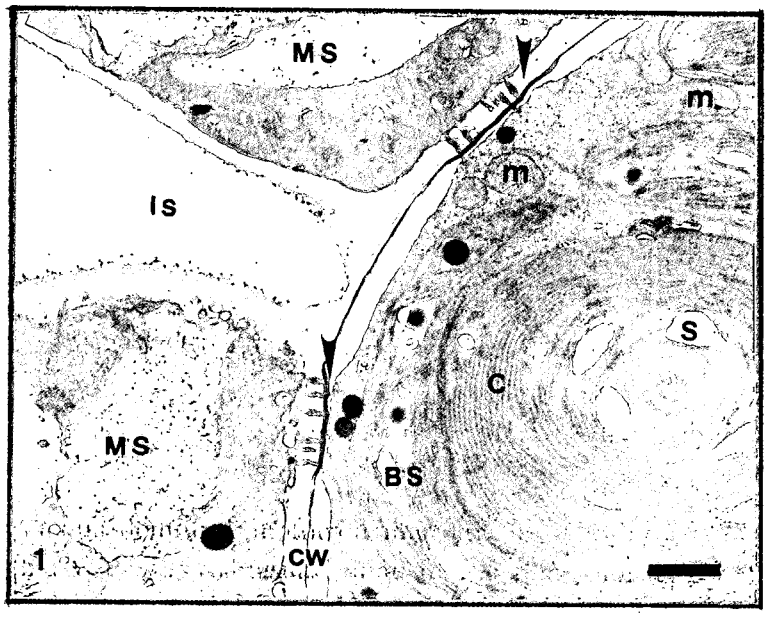

Figure 1. Plasmodesmata and suberized lamella (arrow heads) between the bundle sheath (BS) and mesophyll (MS) cells of *Digitaria sanguinalis*. C, chloroplast; cw, cell wall, Is, intercellular space; m, mitochondria; S, starch. Scale bar = 1 ㎛.