SUPPLEMENTARY DATA

FIG. S1. Area of transverse section of a mature *Zea mays* leaf. The arrows indicate the vascular bundle sheath, while the arrowheads “palisade-like” MCs. This figure has been taken from a slide provided by Carolina Biological Supply (Burlington NC, catalog number 30-3514).

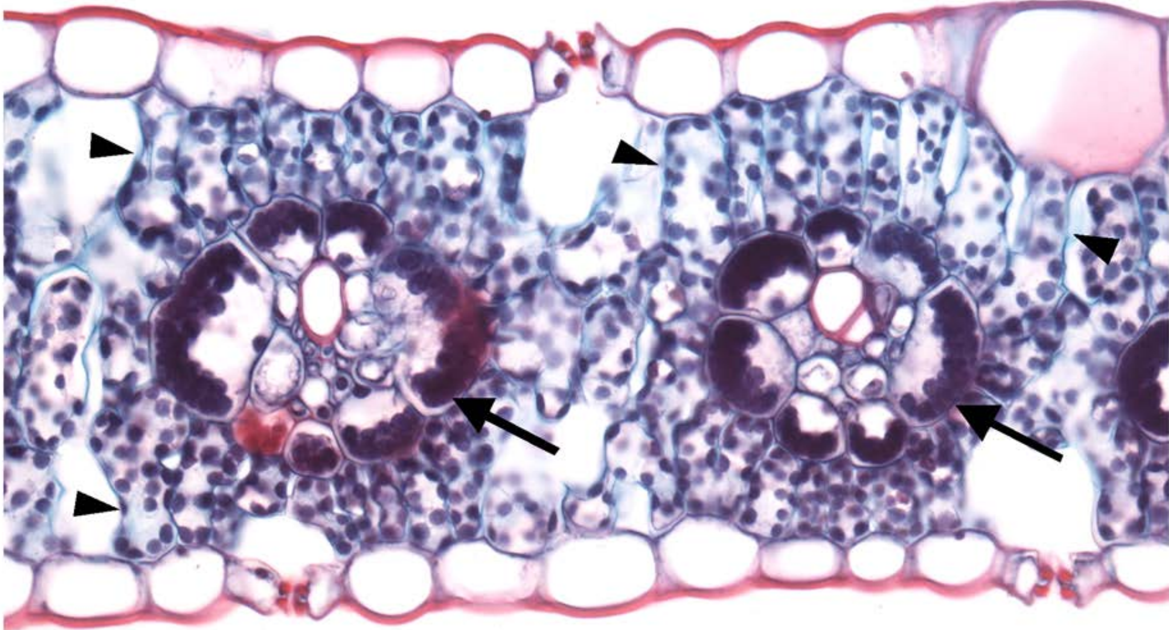

FIG. S2. Shaping MCs as they are seen in DIC optics (**A**, **C**) and in epifluorescence microscope under a set filter provided with exciter G365 and barrier LP420 (**B**) and another with exciter BP450-490 and barrier BP 515-565 (**D**). Under these filters, the cell walls do not emit any autofluorescence. Scale bars = 5 μm.

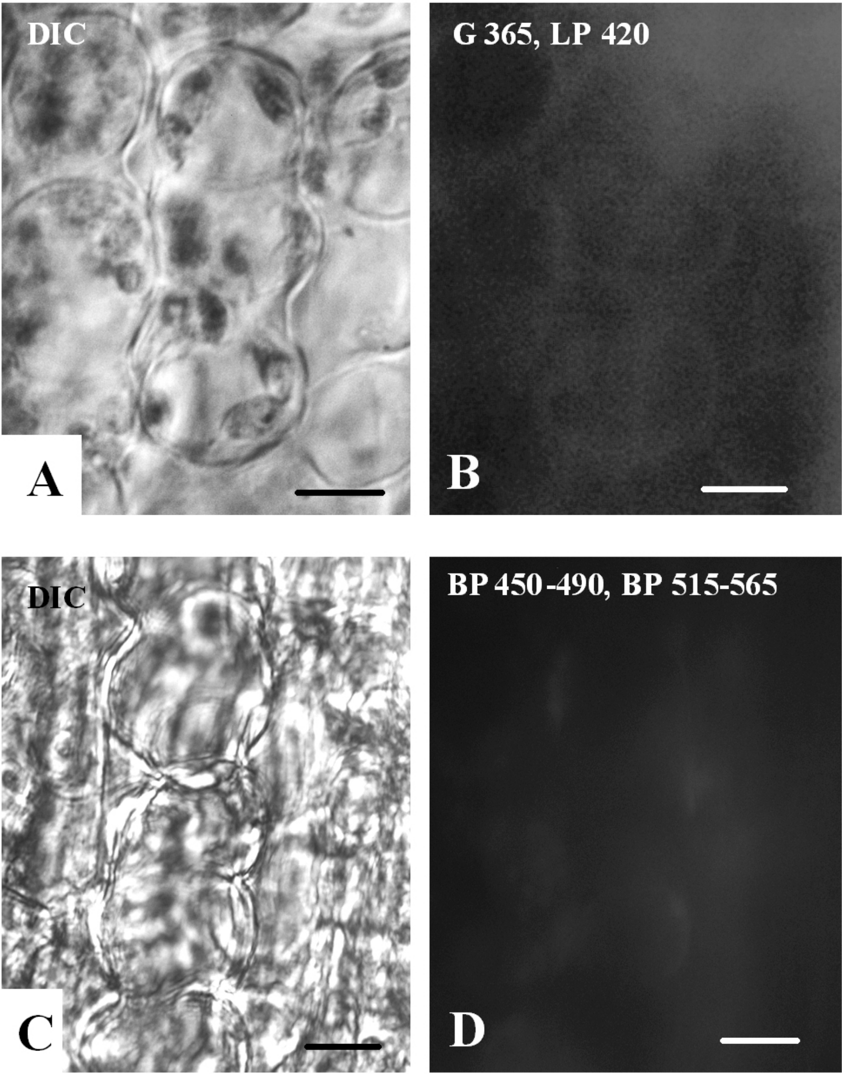

FIG. S3. TEM micrographs of shaping MCs. Scale bars: (**A**-**D**) = 500 nm; **A** *inset* = 2μm.
A: Longitudinal section of the MT-ring (arrows) lining the wall thickening in the region of forming cell isthmus. *Inset:* The shaping MC in lower magnification. The arrows point to the forming cell isthmus shown in **A** in a higher magnification. **B**: Local wall thickening deposited on a longitudinal cell wall at the site of future MC isthmus. MT groups (arrows) line the cell wall thickening on both sides. **C**: Paradermal section of a local cell wall thickening deposited at the region of a future MC isthmus. Note the co-alignment of the cellulose microfibrils (black and white lines) and of the underlying MTs (arrows). **D**: Developing intercellular space (IS) at the site of a forming MC isthmus. Arrows point to the MT-bundles lining the detached cell wall thickenings.

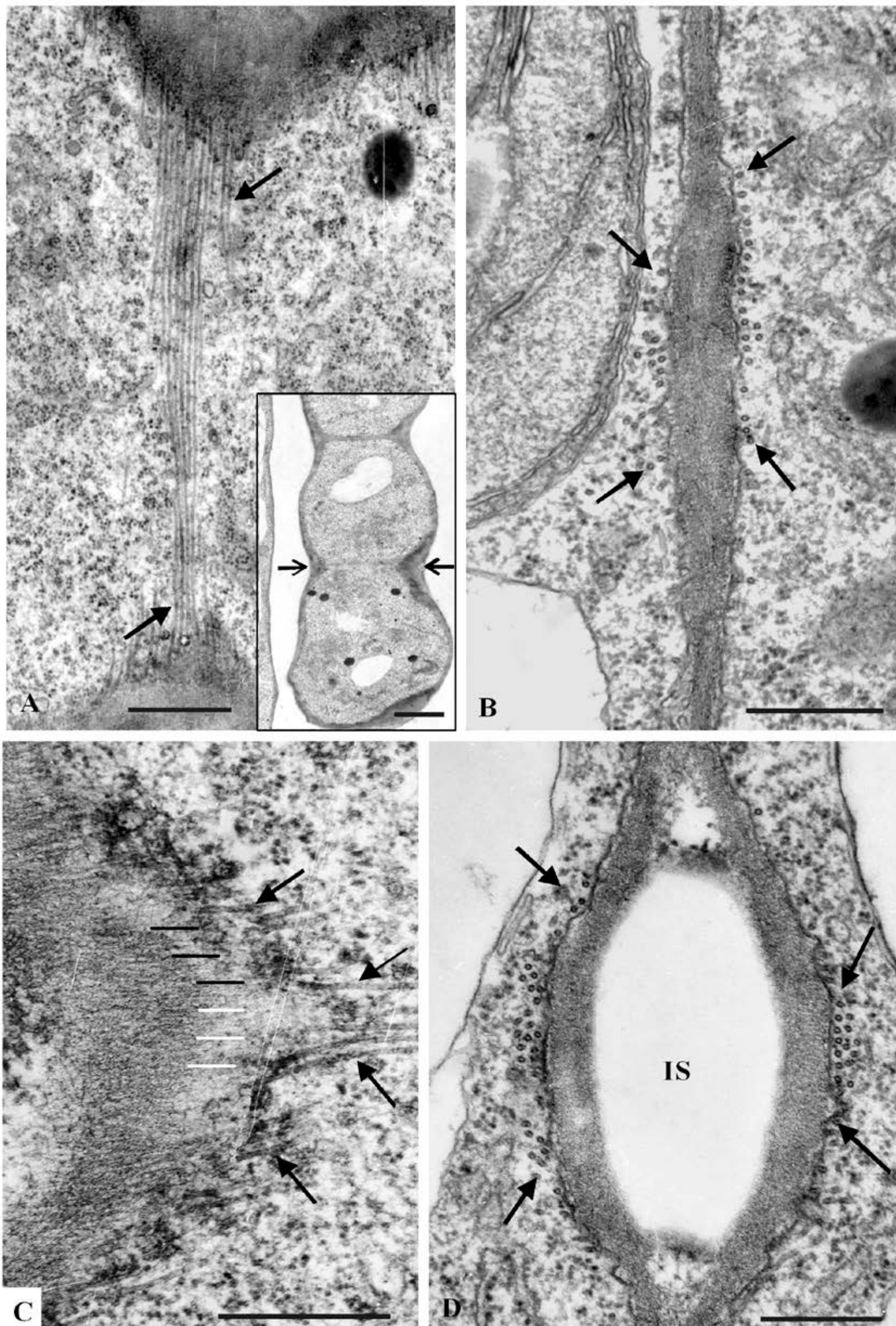

FIG. S4. **A**, **C**: Young (**A**) and shaping (**C**) MCs of *Triticum turgidum* as seen in epifluorescence microscope after aniline blue staining. Callose patches are localized in the area of future (arrows in **A**) and forming (arrows in **C**) MC contacts. **B**, **D**: The MCs seen with DIC optics. Scale bars = 10 μm.

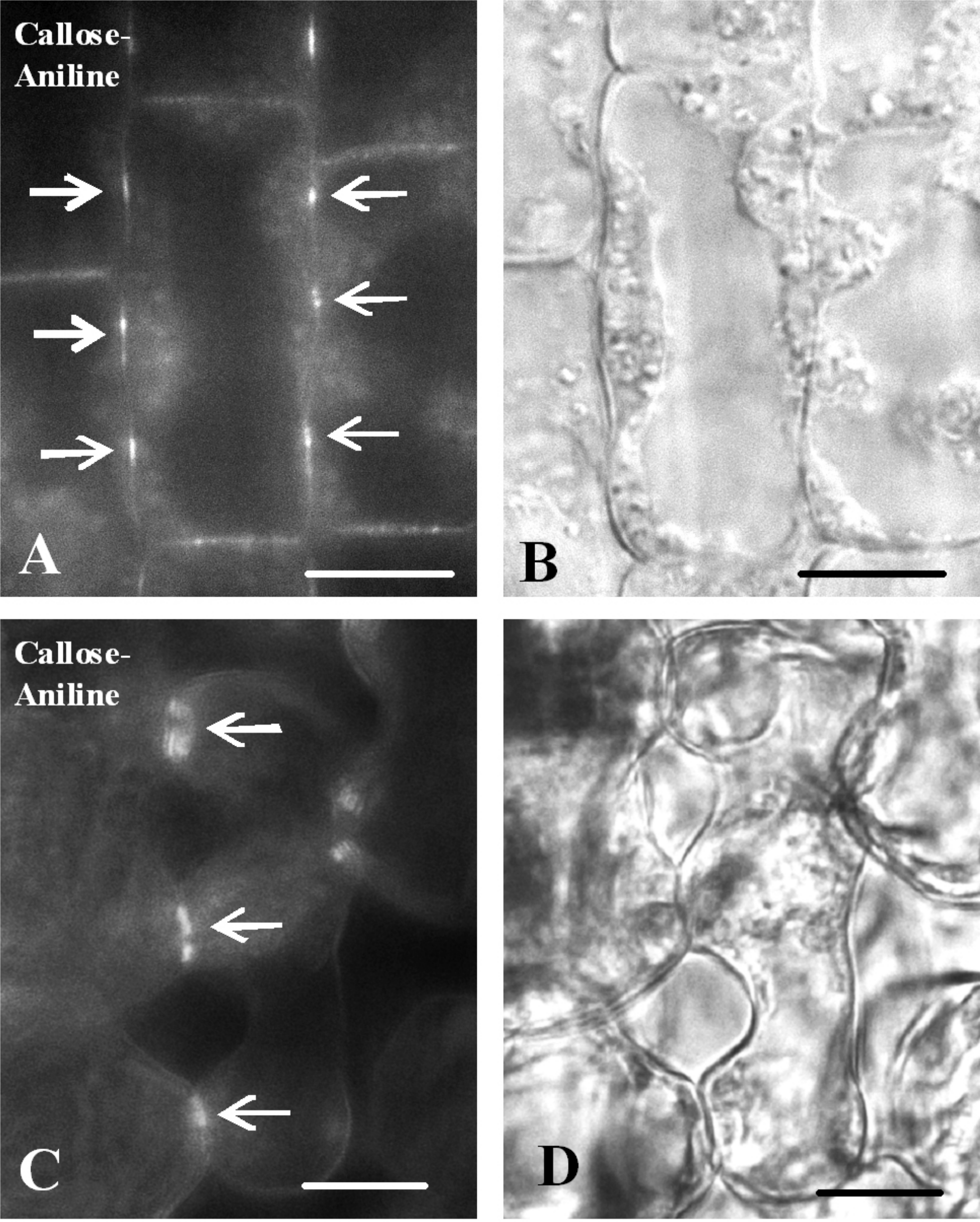

FIG. S5. Immunodetection of cell wall matrix polysaccharides in sections of nascent MCs embedded in LRW. **A_1, C_1, E, G:** Control sections. **B_1, D_1, F, H**: Sections pretreated with 1 M KOH for 1 h at 25 ^{0}C. All sections have been taken from the same leaf part. Scale bars= 10 μm. **A_1-D_2**: Immunodetection of JIM5- (**A_1, B_1**) and JIM7- (**C_1, D_1**) HGA epitopes. Arrows in **A_1** and **C_1** point to the positions where the above HGA epitopes are localized. They have been removed from cell walls after the treatment of sections with KOH (B_1, D_1; cf. A_1, C_1). **A_2, B_2, C_2, D_2**: The areas of MCs presented in **A_1**, **B_1**, **C_1** and **D_1** as appeared with DIC optics. Arrowheads point to intercellular spaces. **E, F:** Callose immunodetection in control section (**E**) and in section pretreated with KOH (**F**). In both cases, callose patches (arrows) are obvious. **G, H.** MLGs immunodetection in control section (**G**) and in section pretreated with KOH (**H**). In both cases, MLGs are localized in cell walls delimiting the developing intercellular spaces (arrowheads), while they are absent from the area of future cell contacts (arrows).