

# **Phosphate-Limited Plants: Rafts are Conserved when Plasma Membrane Phospholipids are Replaced with the Galactolipid DGDG**

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As much as one third of all organically bound phosphate in a plant cell is associated with phosphate-containing membrane lipids. During phosphate-limited growth conditions, phospholipids are replaced with the galactolipid DGDG, with the plasma membrane as a major target for this lipid exchange. We have examined whether the lipid replacement is uniform over the plasma membrane. To study the lateral distribution of the lipid replacement, we isolated plasma membranes and lipid rafts from roots of fully fertilized and phosphate-limited oat. Lipid analyses revealed that whereas 70% of the plasma membrane phospholipids were replaced with DGDG in the phosphate-limited plants, the rafts of these plasma membranes maintained a lipid composition very close to that of the control. To localize the transversal distribution of the lipids, we isolated plasma membrane vesicle populations exposing either the apoplasic or cytosolic membrane leaflet. The two vesicle populations were incubated with phospholipases, a DGDG specific antibody (Jouhet et al 2004 J Cell Biol 167:863) or lipid-specific probes. The strongest transversal lipid asymmetry was obtained for DGDG in plasma membranes from phosphate-limited oat, where more than 90% of the DGDG was located in the cytosolic leaflet of plasma membrane.