

Solutions

2.1 Phloem; translocation.

2.2 Hollow tubes with no cytoplasm – nothing blocks the water column; strengthened by lignin – withstands the pull of the transpiration stream without collapsing.

2.3 Any two: higher humidity; lower temperature; still air; darkness / low light.

3.1 Xylem: hollow, lignin-strengthened tubes of dead cells; carries water and mineral ions only upwards, from roots to leaves. Phloem: sieve-tube elements with few organelles, alive; carries dissolved sugars from leaves to growing and storage regions – translocation, both directions.

3.2 Moving air sweeps water vapour away from just outside the stomata; this maintains a steep concentration gradient of water vapour; so water diffuses out of the leaf faster – a higher transpiration rate.

3.3 The upper surface faces the sun – the hottest and brightest side; fewer stomata there reduce water loss where evaporation would be greatest; CO₂ needs are met by the more numerous lower-surface stomata in cooler, shaded air.