

Executive Summary

Vertical greening is a relatively new concept and practice in providing greenery in Hong Kong. Indoor installations can bring benefits such as improvement in aesthetics and indoor air quality. Stanley Sewage Treatment Works (STW) is the first STW built inside cavern in Hong Kong. To provide an aesthetic and healthier environment for the employees and visitors of STW, the Drainage Services Department (DSD) decided to put up various vertical greenery systems along the entrance corridor for practical and experimentation purposes. This report summarizes the results of the project that examined five different vertical greenery systems and evaluated their performance regarding plant growth and moisture status, which would serve as a reference for future design of indoor vertical greening at DSD facilities with limited outdoor space, especially existing and potential STWs built in caverns. In the 12-month study, VG1 had the best performance among the 5 VG systems. VG1 was the best in plant survival and coverage, and was the most efficient in water saving; plants in VG1 were healthier. The five species were assessed for their CO₂ fluxes at different light intensities and temperatures in the laboratory. CO₂ fluxes of all species decreased with increasing light intensity, and varied with VG systems for a particular species under same light intensity. At low light intensities, CO₂ fluxes were lower at 30°C than at 17°C. At 30°C, all species in VG1 had the highest absorption capability for CO₂. At 17°C, *S. arboricola* and *F. elastica* had the highest CO₂ absorption in VG2, while *P. obtusifolia* and *C. variegata* were highest in VG1. *D. sanderiana* in VG4 had the highest CO₂ absorption. Among the five plant species, *C. variegata* in VG1 had the highest absorption ability of CO₂ at 30°C, while *S. arboricola* in VG2 was highest at 17°C. For the comparison study on the 20 ornamental species, *Chamaedorea elegans*, *Dracaena sanderiana* 'Celica', *Epipremnum aureum* 'Virens', *Aglaonema* 'Silver Queen', *Schefflera arboricola* and *Spathiphyllum wallisii* outperformed other study species in terms of survival and growth in height, leaf number and ecophysiology, implying that they were more suitable for indoor vertical greening. Maintenance played a crucial role in the success of vertical greening. Proper operation of irrigation systems and accessories appears most vital, both regarding plant growth and water conservation, though regular clearance of fallen leaves is beneficial to good hygiene of the panels.