Supplemental Figure S1 Modes of watering.
Modes of watering. In Mode #1, SWC is kept at the same level during the entire experimental period. Mode #2 includes two SWC-keeping steps. Mild drought treatment was conducted using Mode #2. At the beginning of the experiment, the SWC of pots was adjusted to the same level so that water deficit occurs uniformly. Mode #3 includes three SWC-keeping steps. This mode is used primarily for the water withholding study. After reducing SWC to the set level, the pot is re-watered immediately or after a certain time.
Supplemental Figure S2 Image analysis algorithm

Image analysis algorithm. (A) Image for area measurement. Several regions were chosen for reference colors of leaf (yellow square) and background (blue square). (B) Reference region. L: region size (pixel). In this study, we used a reference region of 16 x 16 pixels. (C) Formula to calculate the average color difference between the value of point “P” and reference region using the CIE-L*a*b* color-space parameters which is generated by RGB pixel value of image. (D) Algorithm for image analysis. First, calculate the pixel values of CIE-L*a*b* color-space parameters of point P. The average color difference between “P” and each reference region was calculated using the formula in (C). If the average color difference with the leaf reference region was lower than that of the background, the point “P” was determined as the leaf region. The determination was conducted for all pixels in the image.
Supplemental Figure S3

Plant growth rooms for the control of environmental conditions including temperature, light, day length, and humidity. For precise and repeatable plant phenotyping, the RIPPS platform should be operated under controlled environmental conditions. This photograph shows plant growth room used for the RIPPS platform tests.
Supplemental Figure S4
(A) Pot surface cover. To prevent water evaporation from the soil surface, each pot was covered during the period of transpiration measurement with a disc made of polystyrene board and masking tape. The polystyrene boards (Koyo Sangyo Co., Ltd, Tokyo, Japan) were cut to fit the edge of the pot using a laser cutter (Tonbo Co., Ltd, Kanagawa, Japan). (B, C) To shorten the time to desiccation when the pot moisture reached the selected water level, pots with six slits (1.5 x 40 mm) were used for water deficit treatments. (D, E) After the pot moisture reached the selected level, the slits were covered with a cup sleeve made of formed polyethylene (Green Field Co., Ltd, Tokyo, Japan).
Supplemental Movie S1.
Time-lapse movie of a Col-0 plant growing under well-watered conditions. Sequential top-view color images were obtained at 2 hour intervals for 12 days on the RIPPS platform. Nighttime images were removed before stacking images because the color camera does not detect light with 950 nm wavelength.
Supplemental Movie S2
Time-lapse movie of a Col-0 plant growing under well-watered (3.5 g water g⁻¹ dry soil, left) and mild drought (0.8 g water g⁻¹ dry soil, right) conditions. Sequential top-view images were obtained at 2 hour intervals for 12 days using a black and white camera on RIPPS. For nighttime imaging, LED light with a peak wavelength of 950 nm was used.


Supplemental Movie S3
Time-lapse movie of a Col-0 plant growing under well-watered (3.5 g water g⁻¹ dry soil, left) and mild drought (0.8 g water g⁻¹ dry soil, right) conditions. Sequential side view images were obtained at 2 hour intervals for 12 days using a black and white camera on RIPPS. For nighttime imaging, LED light with a peak wavelength of 950 nm was used.