

September 2009 in brief:

Rainfall at the Royal Botanic Gardens:	72.0 mm
Interception loss:	42.3 mm
Effective rainfall reaching ground:	29.7 mm

The September rainfall exceeded the long-term average measured by the Bureau of Meteorology at the city observing station, which is 58.0 mm. The long-term average is for 10.1 days in September to receive at least 1 mm of rain. In September 2009 at the Royal Botanic Gardens, 11 days exceeded this value, confirming that there was an average number of rain days during the month.

Table 1: September 2009 rainfall summary, Royal Botanic Gardens, for each rain day. (note: only days with more than 1 mm are listed).

Date (2009)	Rainfall (mm)	approximate rain duration (hour)	average rainfall rate (mm/h)
4 September	3.0	3	1.0
7 September	3.0	5	0.6
8 September	5.0	6	0.8
17 September	12.0	8	1.5
19 September	3.5	1	3.5
21 September	11.5	3	3.8
22 September	7.5	2.5	3.0
24 September	7.0	1	7.0
25 September	7.5	5	1.5
26 September	6.5	6	1.0
28 September	4.0	10	0.4

Table 2: September 2009 throughfall summary, Royal Botanic Gardens, for each rain day. (This Table lists the throughfall expressed as a percentage of the open-field rainfall for each day). Days when irrigation occurred are not included in the table or the calculations shown here.

Date (2009)	Throughfall % AFW1	Throughfall % AFW3	Throughfall % AFW4
4 September	30.8	7.7	30.8
7 September	15.4	11.6	19.3
8 September	53.2	25.4	41.7
17 September	77.1	55.9	77.1
19 September	52.8	23.1	49.5
21 September	83.4	57.3	96.5
22 September	104.8*	66.3	101.7*
24 September	77.6	47.9	62.8
25 September	43.2	29.3	38.5
26 September	46.2	16.0	28.5
28 September	26.0	5.8	57.8
<i>average effective rainfall (mm)</i>	<i>35.1</i>	<i>19.2</i>	<i>34.7</i>

NB: AFW = Australian Forest Walk (sites 1, 3, and 4).

Data for HB (Herbarium bed) and AFW2 are not included owing to instrumental malfunction.

* indicates that this value exceeds the open-field rainfall, and may reflect measurement of drips falling from adjacent plants, carried by wind.

Brief commentary on the results for September 2009:

On days when there was no active irrigation in the gardens, the total rainfall was 71.5 mm. The rain was of low to moderate intensity, averaging about 2.2 mm/h, but reached 7 mm/h on September 24, and more than 3 mm/h on September 19, 21, and 22. During one short (24-minute) shower, the rainfall rate averaged 11.3 mm/h, which represents very heavy

Effective rainfall report, Royal Botanic Gardens, for month of September 2009.

rain. In September wet spells, it typically rained for about 5 hours, and the wet spells delivered on average about 5.4 mm of rain.

The average fraction of the open-field rain falling through the tree canopy across the three monitoring sites included in Table 2 above was 41.2%. The highest proportion was about 100% (slightly more than 100% being recorded, probably owing to drips from adjacent plants being blown into the throughfall collectors) AFW1 and AFW4 on September 22. This high throughfall fraction (and negligible interception loss) is likely to have resulted from moderately intense rain on that day, and foliage remaining wet after about 15 mm of rain that fell during the previous 72 hours. Low throughfall fractions included just 5.8% at AFW3 from the 4 mm of rain on September 28, and 7.7% at AFW3 from the 3 mm of rain on September 4. These small showers are evidently quite ineffective at delivering moisture to the soil, and are mostly lost to evaporation.

The average interception loss rate was 58.8%. This is a high figure but not surprising in view of the low rainfall intensities, frequent small rainfall events, and mild temperatures. The lowest daily loss was nearly zero on September 22, as noted above in relation to the high throughfall fractions.

From the total of 72.0 mm of open-field rainfall, the total effective rainfall arriving at the ground in September 2009, averaged across AFW1, AFW3, and AFW4, was 29.7 mm. Thus, only about 41% of the open-field rainfall arrived at the ground under the trees and shrubs. There is some variation among the sites, related to the kind and density of the foliage above the throughfall collectors.

It is worth noting that some additional water would have reached the ground as stemflow, trickling down the branches and stems of plants, but this has not been measured. Stemflow typically amounts to less than 10% of the rainfall reaching the ground.