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Artificial rainfall experiments for green roofs depending on the flow length at 0 degrees and 2 % slope and different rain intensities

Version 1 (31 Mar 2021)

The measurements include the saturated setups in triplicate (setups A7, A8 and A9). The equipment and materials are described in more detail in the following article and the associated supplement:

Förster, K., Westerholt, D., Kraft, P., & Lösken, G. (2021): Unprecedented retention capabilities of extensive green roofs – New design approaches and an open-source model (under review).

The following setups were analysed and simulated in the article:

2015: 2015-11a to 2015-24

2019: 2019-27 to 2019-44 (excluding 2019-31, 2019-35 and 2019-36)

2020: 2020-46 to 2020-62 (excluding 2020-50, 2020-55 and 2020-59).

The complete measurement series comprises the following setups in the test facility:

ID	Type of setup	Year	Slope
A1	Empty test track	2015, 2019	0%; 2%
A2	Protective fleece 300g/m²	2015, 2019	0%; 2%
A3	Protective fleece 300g/m² + drainage mat 2.5 cm	2015	0%
A4	Protective fleece 300g/m² + drainage mat 1 cm	2019	2%
A5	Protective fleece 300g/m² + drainage mat 1cm + 8 cm extensive substrate 1	2015	0%
A6	Protective fleece 300g/m² + drainage mat 2.5 cm + filter fleece 100g/m² + 8cm extensive substrate 1	2015	0%
A7	Protective fleece 300g/m² + 10 cm extensive substrate 1	2015	0%
A8	Protective fleece 300g/m² + 8 cm extensive substrate 1	2015	0%
A9	Protective fleece 300g/m² + 8 cm extensive substrate 2	2019, 2020	2%

The complete Analysis will be published online shortly.

Measurements 2015

Exp. ID	Type	Slope [%]	Length [m]	Rainfall (15 min) [L]
2015-11a	A7	0	20	540[a]
2015-11	A7	0	20	540[a]
2015-12	A7	0	20	540[a]
2015-13	A7	0	20	540[a]
2015-14	A8	0	20	540[a]
2015-15	A8	0	20	540[a]
2015-16	A8	0	20	540[a]
2015-17	A8	0	20	540[a]
2015-18	A8	0	20	540[a]
2015-19	A8	0	20	540[a]
2015-20	A8	0	15	405[a]
2015-21	A8	0	15	405[a]
2015-22	A8	0	10	235
2015-23	A8	0	10	270[a]
2015-24	A8	0	5	135[a]

a = 1.8 mm min^{-1} = 300 l s^{-1} ha^{-1}

Measurements 2019

Exp. ID	Type	Slope [%]	Length [m]	Rainfall (15 min) [L]
2019-27	A9	2	20	540[a]
2019-28	A9	2	20	540[a]
2019-29	A9	2	20	540[a]
2019-30	A9	2	20	540[a]
2019-32	A9	2	15	405[a]
2019-33	A9	2	15	405[a]
2019-34	A9	2	15	405[a]
2019-37	A9	2	10	270[a]
2019-38	A9	2	10	270[a]
2019-39	A9	2	10	270[a]
2019-40	A9	2	5	135[a]
2019-41	A9	2	5	135[a]
2019-42	A9	2	5	135[a]
2019-43	A9	2	5	135[a]
2019-44	A9	2	5	135[a]

a = 1.8 mm min^{-1} = 300 l s^{-1} ha^{-1}

Measurements 2020

Exp. ID	Type	Slope [%]	Length [m]	Rainfall (15 min) [L]
2020-45	A9	2	20	360
2020-46	A9	2	20	360[b]
2020-47	A9	2	20	360[b]
2020-48	A9	2	20	360[b]
2020-49	A9	2	20	360[b]
2020-51	A9	2	15	270[b]
2020-52	A9	2	15	270[b]
2020-53	A9	2	15	270[b]
2020-54	A9	2	15	270[b]
2020-56	A9	2	10	180[b]
2020-57	A9	2	10	180[b]
2020-58	A9	2	10	180[b]
2020-60	A9	2	5	90[b]
2020-61	A9	2	5	90[b]
2020-62	A9	2	5	90[b]

b = 1.2 mm min^{-1} (200 l s^{-1} ha^{-1}),