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## ON THE AMOUNT OF DEW IN FINLAND

by

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### A b s t r a c t

Measurements on the amount of dew were made at 12 stations in Finland during the period May—October in 1967 and 1968. Duvdevani dew gauges were installed at a height of 20 cm above grass surface. The results indicate that the total amount of dew increases with decreasing latitude, in particular in the middle of the summer when the polar nights are very short. The amount of dew at a certain station is also connected with the number of rainless nights and considerable variations may thus occur in monthly summaries.

Earlier observations on the amount of dew in Finland are very few in number. HOMÉN [3] estimated the amount of dew on several kinds of cloth which were stretched on grass surface. His results varied from 0,12 to 0,18 mm/night depending on the material. These values are arithmetical means of seven dew nights in July and August in 1892. FRANSSILA [2], on the other hand, calculated the amount of condensed water from the observations of the vertical distribution of vapour pressure. Amounts from 0,04 to 0,23 mm were estimated during seven dew nights in June and August in 1934. The mean value of these observations was 0,14 mm/night. Both results are in good accordance with our estimations in Table 2.

### 1. *Observations*

The use of Duvdevani dew gauges in Finland meets with some difficulties. The observations are made by identifying the appearance of dew droplets on the surface of a gauge with one of a series of standard

photographs of dew. It is known from experience [5] that the observations must be made within an hour after sunrise in order to avoid confusion due to evaporation of dew droplets. The hour of the sunrise, however, is very early in Finland in midsummer. This difficulty could be overcome by installing the dew gauges at airports and observatories where regular weather observations are made day and night. Another inconvenience of the Duvdevani method is the fact that only estimation of liquid dew is included in the system but no recommendation is given of the evaluation of solid frost or frozen dew. This is a serious drawback because night frosts may occur at any time of the year in North Finland. The water equivalent of frost in connection with this study was estimated by multiplying the mean height of frost on the gauge by 0,08 [4]. This method obviously gives satisfactory results but the value of the constant may depend on the type of frost and more information is thus needed for a complete analysis. It is expected that the method for estimation of frost will improve during the next summer when comparisons will be made between Duvdevani gauges and recording frost gauges. It should be noted that frost was observed only in May and October and the influence of possible errors on the results is quite negligible.

The following airports and observatories were selected for dew observations:

	Latitude	Longitude	Height above sea level
Mariehamn			
(Maarianhamina) airport	60°07'	19°54'	4 m
Helsinki »	60°19'	24°58'	52
Jokioinen observatory	60°49'	23°29'	103
Lappeenranta airport	61°03'	28°09'	105
Jyväskylä »	62°24'	25°40'	141
Joensuu »	62°40'	29°38'	118
Vaasa »	63°03'	21°46'	6
Kajaani »	64°17'	27°41'	134
Oulu »	64°56'	25°22'	13
Rovaniemi »	66°34'	25°50'	194
Sodankylä observatory	67°22'	26°39'	178
Ivalo airport	68°36'	27°25'	140

Summaries of the results are presented in Tables 1 and 2 as well as in Fig. 1. Because the period of observations is rather short, no data are given of the frequency distribution of the amount of dew. This question, together with the prediction of dew, will be handled later on after more data are available.

Table 1. Amount of dew in millimetres during the period May—October in 1967 and 1968

		V	VI	VII	VIII	IX	X	Total
Mariehamn (Maarianhamina)	1967	1,02	1,07	2,05	2,82	3,71	1,12	11,79 mm
	1968	1,40	0,90	1,78	2,14	1,60	0,32	8,14
	Mean	1,21	0,98	1,92	2,48	2,66	0,72	9,96
Helsinki	1967	0,67	0,99	1,42	2,54	2,48	1,58	9,68
	1968	0,82	0,84	1,02	2,52	2,49	0,66	8,35
	Mean	0,74	0,92	1,22	2,53	2,48	1,12	9,02
Jokioinen	1967	0,93	1,36	1,84	2,65	2,76	1,25	10,79
	1968	1,20	1,42	2,00	3,12	1,98	1,26	10,98
	Mean	1,06	1,39	1,92	2,88	2,37	1,26	10,88
Lappeenranta	1967	0,55	0,83	1,63	2,87	3,41	1,81	11,10
	1968	1,49	0,58	0,70	3,12	1,77	1,18	8,84
	Mean	1,02	0,70	1,16	3,00	2,59	1,50	9,97
Jyväskylä	1967	0,63	1,02	1,14	1,68	3,25	1,24	8,96
	1968	1,14	1,26	1,41	2,23	2,11	0,94	9,09
	Mean	0,88	1,14	1,28	1,96	2,68	1,09	9,02
Joensuu	1967	0,53	0,33	1,64	2,46	2,33	0,71	8,00
	1968	0,60	1,10	0,90	1,90	1,55	0,32	6,37
	Mean	0,56	0,72	1,27	2,18	1,94	0,52	7,18
Vaasa	1967	0,68	0,79	1,23	2,26	2,52	1,62	9,10
	1968	0,91	1,00	1,18	2,76	1,47	0,53	7,85
	Mean	0,80	0,90	1,20	2,51	2,00	1,08	8,48
Kajaani	1967	0,59	0,30	0,87	1,66	2,79	0,66	6,87
	1968	0,51	0,64	0,71	1,75	0,98	0,68	5,27
	Mean	0,55	0,47	0,79	1,70	1,88	0,67	6,07
Oulu	1967	0,43	0,25	0,53	1,48	2,56	0,62	5,87
	1968	0,38	0,54	0,52	2,04	1,21	0,44	5,13
	Mean	0,40	0,40	0,52	1,76	1,88	0,53	5,50
Rovaniemi	1967	0,29	0,12	0,28	1,46	2,22	1,00	5,37
	1968	0,12	0,12	0,16	0,93	1,53	0,62	3,48
	Mean	0,20	0,12	0,22	1,20	1,88	0,81	4,42
Sodankylä	1967	0,68	0,24	0,46	1,24	1,36	0,92	4,90
	1968	0,43	0,19	0,70	1,40	1,28	0,96	4,96
	Mean	0,56	0,22	0,58	1,32	1,32	0,94	4,93
Ivalo	1967	0,68	0,10	0,46	1,02	0,65	0,44	3,35
	1968	0,38	0,06	0,36	0,74	0,94	0,54	3,02
	Mean	0,53	0,08	0,41	0,88	0,80	0,49	3,18
All stations	1967	0,64	0,62	1,13	2,01	2,50	1,08	7,98
	1968	0,78	0,72	0,95	2,05	1,58	0,70	6,78
	Mean	0,71	0,67	1,04	2,03	2,04	0,89	7,38

Table 2. Mean number of dew nights (N) and mean amount of dew per night (M) during the period May—October in 1967 and 1968

		M o n t h						
		V	VI	VII	VIII	IX	X	Total
Mariehamn	N	13	12	20	20	16	8	89 nights
(Maarianhamina)	M	0,09	0,09	0,10	0,13	0,16	0,08	0,112 mm/night
Helsinki	N	11	13	20	19	18	12	93
	M	0,07	0,07	0,06	0,13	0,13	0,10	0,097
Jokioinen	N	14	18	25	22	20	12	111
	M	0,07	0,08	0,08	0,13	0,12	0,10	0,098
Lappeenranta	N	13	12	17	20	19	12	93
	M	0,08	0,06	0,07	0,15	0,14	0,13	0,107
Jyväskylä	N	14	18	22	21	21	12	108
	M	0,06	0,06	0,06	0,09	0,13	0,09	0,084
Joensuu	N	10	11	15	18	16	8	78
	M	0,06	0,06	0,08	0,12	0,12	0,07	0,093
Vaasa	N	14	16	22	22	20	10	104
	M	0,06	0,06	0,06	0,11	0,10	0,11	0,082
Kajaani	N	13	12	15	18	16	9	83
	M	0,04	0,04	0,05	0,09	0,12	0,07	0,073
Oulu	N	9	11	10	19	18	11	78
	M	0,04	0,04	0,05	0,09	0,10	0,05	0,070
Rovaniemi	N	5	5	6	13	15	8	52
	M	0,05	0,02	0,04	0,09	0,12	0,10	0,086
Sodankylä	N	15	8	12	20	16	10	81
	M	0,04	0,03	0,05	0,06	0,08	0,10	0,060
Ivalo	N	12	4	10	15	13	10	64
	M	0,05	0,02	0,04	0,06	0,06	0,05	0,050
All stations	N	11,8	11,7	16,2	19,0	17,4	10,0	86,1 nights
	M	0,060	0,057	0,064	0,107	0,117	0,090	0,086 mm/night

## 2. Conclusions

1. The total amount of dew collected on the Duvdevani dew gauge during the period May—October is in South Finland of an order of 10 mm and in North Finland of an order of 3—5 mm. The difference is most obvious in midsummer when the polar nights are very short and the amount of dew is negligible in North Finland.

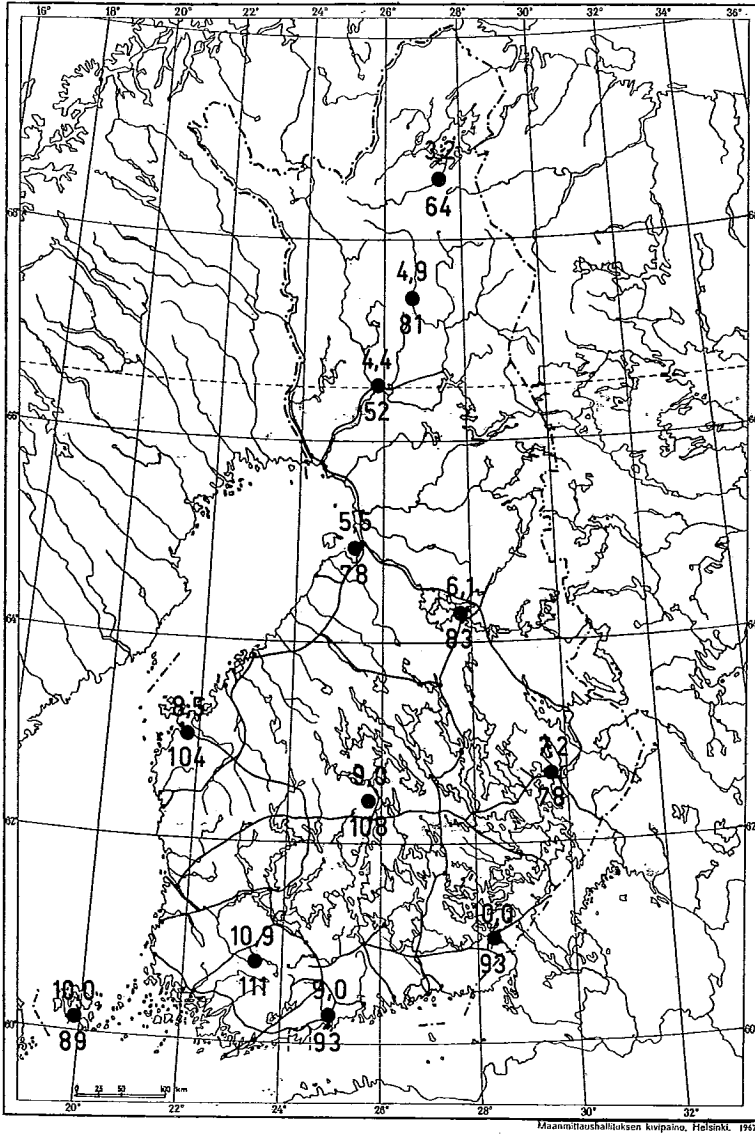


Fig. 1. Total amount of dew in millimetres (upper figures) and number of dew nights (lower figures) during the period May—October in Finland. For detailed data see Tables 1 and 2.

2. Most dew is observed in August or September. The amount of dew and the number of dew nights may vary considerably due to varying number of rainless nights in different years and months.
3. The amount of dew during the period May—October is in South Finland about 3 per cent and in North Finland about 1,5 per cent of the normal precipitation of the same period. The influence of dew on the water balance of the vegetation is probably insignificant in normal years.

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