Mini Review

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Cattle Hypomagnesemia, Puerperal Tetany and Mg/Ca Ratio of Cropland and Groundwater

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ABSTRACT

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Mini Review

Cattle hypomagnesemia has been typically a pasture disease and labeled "grass tetany", but after its increase during indoor periods only single label "hypomagnesemia" has been used after 1983. Cropland and groundwater (gw) Mg/Ca ratio in Finnish Rural Centers (RC) [1]. Northern RC's are MK11, MK16, 17, 18 and 19 are labeled with gray color. Agricultural soil Mg/Ca is higher in North than in In Other parts of Finland (with and without exclusion of Åland), but not in groundwater. Numbers of Finnish Provinces are from [2]. Data on veterinary monthly reports by provinces are only partially available [3], concerning December 1979, December 1981, December 1985, December 1989, December 1991, December 1992, December 1993, Year 1994, Year 1995 and Year 1996. Provinces are in order of the Rural Centers labeled by the numbers of [2]: given by abbreviations since 1991: 01 Uudenmaan - UL, 02 Turun ja Porin - T-PL, 03 Ahvenanmaa – ÅL (Åland), 04 Hämeen - HL, 05 Kymen - KYL, 06 Mikkelin - ML, 08 Kuopion - KUL, 07 Pohjois-Karjalan – P-KL, 09 Keski-Suomen – K-SL, 10 Vaasan - VL, 11 Oulun - OL, 12 Lapin – LL. About 1/3 of MK16 Central Ostrobothnia in belonging to "Vaasan" [4], but here "Vaasan" has been treated as a pure part of South Finland (Figures 1 & 2) (Tables 1 & 2).

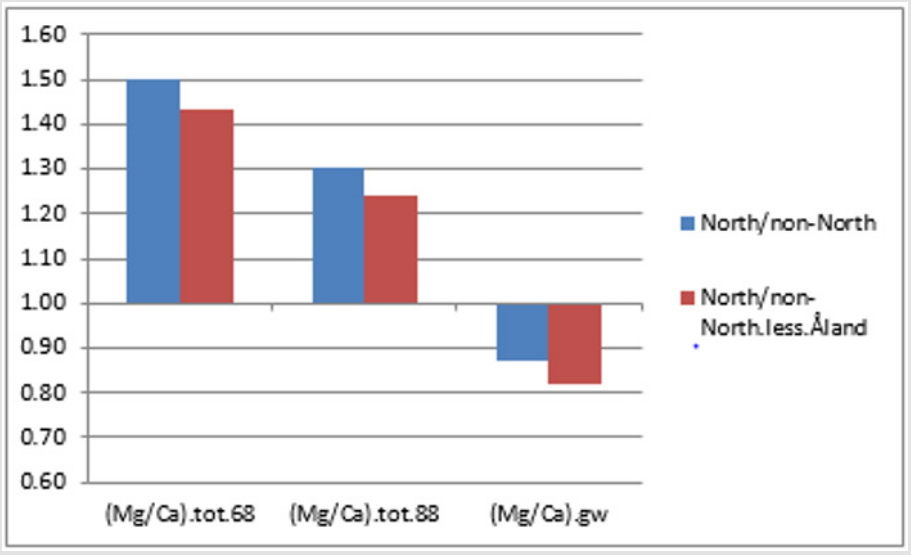

Figure 1.

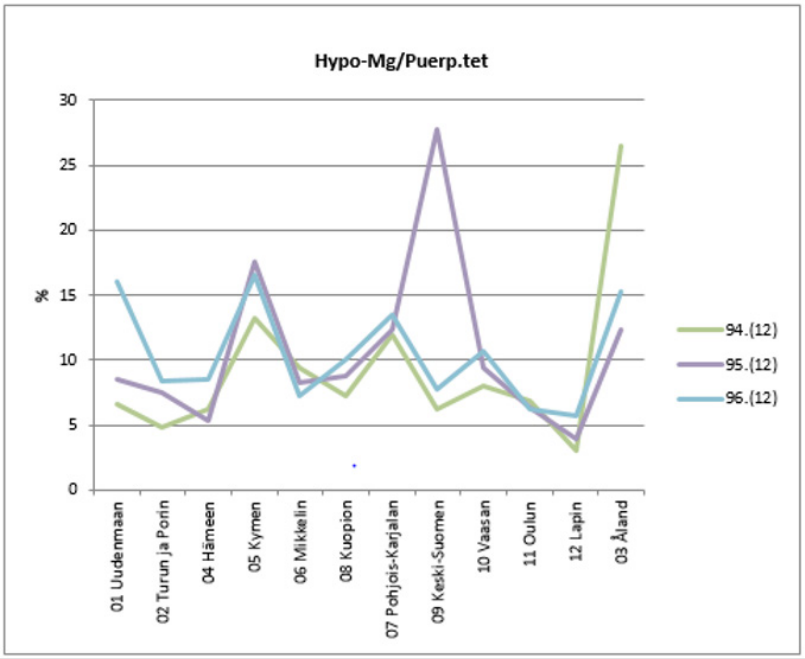

Figure 2.

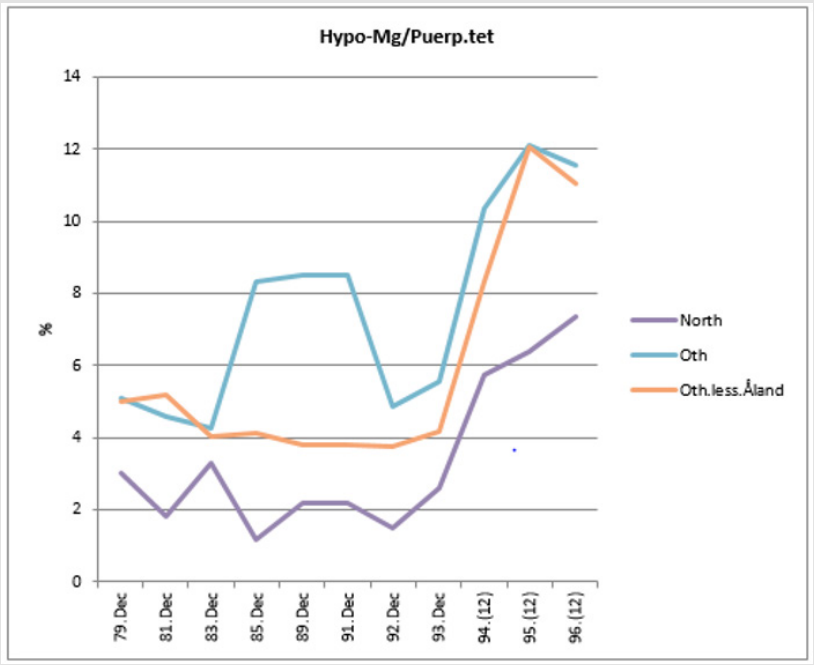

Figure 3.

Table 1.

	(Mg/Ca).tot.68	(Mg/Ca).tot.88	(Mg/Ca).gw
MK01 Uusimaa	0.27	0.312	0.53
MK02 Varsinais-Suomi	0.282	0.26	0.58
MK04 Satakunta	0.181	0.222	0.35
MK05 Kanta-Häme	0.286	0.296	0.61
MK06 Pirkanmaa	0.209	0.227	0.45
MK07 Päijät-Häme	0.176	0.203	0.41
MK08 Kymenlaakso	0.232	0.288	0.41

MK09 South Karelia	0.157	0.191	0.39
MK10 Etelä-Savo	0.152	0.167	0.29
MK11 Pohjois-Savo	0.231	0.234	0.32
MK12 North Karelia	0.165	0.214	0.33
MK13 Central Finland	0.202	0.221	0.32
MK14 South Ostrobothnia	0.21	0.258	0.36
MK15 Ostrobothnia	0.234	0.267	0.46
MK16 Central Ostrobothnia	0.272	0.296	0.34
MK17 North Ostrobothnia	0.349	0.333	0.35
MK18 Kainuu	0.324	0.292	0.32
MK19 Lapland	0.341	0.339	0.41
MK21 Åland	0.073	0.081	0.08
North	0.303	0.299	0.347
SW.less.Åland	0.216	0.241	0.447
SE	0.203	0.24	0.369
(SW+SE).less.Åland	0.212	0.241	0.423
Åland	0.073	0.081	0.081
non-North	0.202	0.229	0.398

Table 2.

Hypomagnesemia												
	01 Uudenmaan	**02 Turun ja Porin**	**04 Hämeen**	**05 Kymen**	**06 Mikkelin**	**08 Kuopion**	**07 Pohjois-Karjalan**	**09 Keski-Suomen**	**10 Vaasan**	**11 Oulun**	**12 Lapin**	**03 Åland**
79.Dec	38	25	21	10	8	6	6	12	19	25	4	1
81.Dec	25	22	10	23	4	2	21	3	16	14	1	0
83.Dec	33	19	16	12	7	15	1	5	10	13	4	1
85.Dec	29	14	8	12	4	5	15	0	24	8	0	5
89.Dec	6	7	16	18	6	8	6	0	23	7	1	6
.91.Dec	6	7	16	18	6	8	6	0	23	7	1	6
92.Dec	2	8	10	16	5	1	8	1	7	11	0	2
93.Dec	8	8	6	27	4	5	10	0	15	16	2	2
94.(12)	117	131	222	317	189	298	252	98	436	336	28	27
95.(12)	117	164	149	314	155	325	198	365	432	281	31	18
96.(12)	201	154	226	243	132	357	206	105	482	258	40	17

Table 3.

Puerperal tet												
	01 Uudenmaan	**02 Turun ja Porin**	**04 Hämeen**	**05 Kymen**	**06 Mikkelin**	**08 Kuopion**	**07 Pohjois-Karjalan**	**09 Keski-Suomen**	**10 Vaasan**	**11 Oulun**	**12 Lapin**	**03 Åland**
79.Dec	351	444	456	303	253	448	295	161	608	520	136	18
81.Dec	253	400	324	337	236	305	219	173	529	397	81	23
83.Dec	348	413	421	278	170	446	200	142	533	446	112	16
85.Dec	291	367	335	290	204	373	213	203	654	367	47	12
89.Dec	219	284	337	177	222	306	223	115	466	311	59	13
.91.Dec	219	284	337	177	222	306	223	115	466	311	59	13
92.Dec	173	224	213	173	156	255	144	120	367	267	63	15
93.Dec	184	214	339	230	219	411	159	167	415	363	90	12
94.(12)	1755	2687	3549	2393	2008	4088	2112	1586	5445	4861	929	102
95.(12)	1384	2206	2826	1791	1883	3711	1604	1317	4569	4434	778	146
96.(12)	1256	1849	2668	1465	1836	3559	1529	1365	4498	4111	697	111

Table 4.

(Hypo-Mg/Puerp.tet) %												
	01 Uudenmaan	02 Turun ja Porin	04 Hämeen	05 Kymen	06 Mikkelin	08 Kuopion	07 Pohjois-Karjalan	09 Keski-Suomen	10 Vaasan	11 Oulun	12 Lapin	03 Åland
79.Dec	10.8	5.6	4.6	3.3	3.2	1.3	2	7.5	3.1	4.8	2.9	5.6
81.Dec	9.9	5.5	3.1	6.8	1.7	0.7	9.6	1.7	3	3.5	1.2	0
83.Dec	9.5	4.6	3.8	4.3	4.1	3.4	0.5	3.5	1.9	2.9	3.6	6.3
85.Dec	10	3.8	2.4	4.1	2	1.3	7	0	3.7	2.2	0	41.7
89.Dec	2.7	2.5	4.7	10.2	2.7	2.6	2.7	0	4.9	2.3	1.7	46.2
91.Dec	2.7	2.5	4.7	10.2	2.7	2.6	2.7	0	4.9	2.3	1.7	46.2
92.Dec	1.2	3.6	4.7	9.2	3.2	0.4	5.6	0.8	1.9	4.1	0	13.3
93.Dec	4.3	3.7	1.8	11.7	1.8	1.2	6.3	0	3.6	4.4	2.2	16.7
94.(12)	6.7	4.9	6.3	13.2	9.4	7.3	11.9	6.2	8	6.9	3	26.5
95.(12)	8.5	7.4	5.3	17.5	8.2	8.8	12.3	27.7	9.5	6.3	4	12.3
96.(12)	16	8.3	8.5	16.6	7.2	10	13.5	7.7	10.7	6.3	5.7	15.3

Discussion

Increase of Hypo-Mg/Puerperal tetany ratio after 1993 shows that hypomagnesemia is still more common during pasture period. It can even depend on several other factors: e.g. variation of weather, temperature and grass digestibility (incl sugars) (Tables 3 & 4).

In closer analysis is seen one discrepancy: HMg associates in 1979, 1981 & 1983 (slightly) positively with (Mg/Ca).soil, even by using linearly interpolated (Mg/Ca) ratios (calculated by values from 1976-80 (.78) and 1986- 80 (.88). This needs a new assessment. Data on period 1979- 83 should be opened.

Phosphor and obvious association of hyperirritative syndromon with HMg seems to need a closer assessment, too.

Conclusion

Ratio of cattle hypomagnesemia cases per cases of puerperal paresis in monthly reports of veterinary surgeons were constantly lower in North Finland than in other parts of Finland, where Mg/Ca ratio of soil was lower (1965-85), but groundwater Mg/Ca higher. This suggests on higher importance of cropland than gw Mg/Ca ratio in livestock and human nutrition.

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