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1. The Plateau fir woods of the western Midlands of Canton Aargau and the adjacent beech forests have already been thoroughly investigated by Frehner (1963) from the sociological point of view. The Querco-Abietetum sphagnetosum (Qu As) differs from the Melico-Fagetum blechnetosum (MFb), the Melico-Fagetum caricetosum remotae (MFc) respectively, by the occurence of a couple of acidophilous mosses and the absence of numerous beech companions. For the ecological delimitation, two pairs with adjacent beech- and fir-stands in a forested area west of Vordemwald and south of Rothrist, Canton Aargau, have been chosen.

- Station "Bim scharfen Eggen": QuAs-MFb
- Station "Gfill-Ischlag": QuAs-MFc

2. In order to characterize the water economy, by means of 96 tensiometers, read every three days, the absorption tension in 10, 50 and 100 cm depth has been calculated. In each stand, 8 tensiometers for each particular depth were in action.

3. The gradient analysis has proved the most appropriate method to interpret critical problems of two or several adjacent vegetation units. For this purpose, by means of two transects—one between QuAs and MFb (Station "Bim scharfen Eggen"), one between QuAs and MFc (Station "Gfill-Ischlag")—experimental areas of 1 m^2 surface have been staked out in regular distances, investigated floristically and mixed samples have been taken from depths of 0 to 5 cm (humus without litter cover) and 5 to 15 cm (mineral soil). In the humus have been examined: pH, water content, organic matter, total nitrogen, C/N relationship, ammonification, nitrification, exchangeable aluminum.

In the mineral soil horizon pH, water content, cation exchange capacity, S-value, base saturation degree, exchangeable H-ions, lactate soluble phosphate and potassium have been measured.

4. The transects from QuAs to MFb and from QuAs to MFc show distinctly marked floristical gradients. A sharp limit between the two adjacent vegetation units could not be ascertained. The broad transition area, characterized by common occurence of species of both vegetation units (between QuAs and MFc) or by absence of these species (QuAs and MFb) is made obvious by the calculation of the dominance common coefficient ("Artmächtigkeit = Gemeinschaftskoeffizient"): vegetation as a spatial continuum.

5. The course of the absorption tension during the growing season (beginning of May until beginning of November) permit to ascertain strong differences between QuAs and MFb: The QuAs is considerably more humid than the MFb and shows in spring and summer after abundant precipitation a water level at a depth of 50 cm (pseudogley). The MFb is far more dry and shows no water level above 100 cm (base lacking brown earth: "basenarme Braunerde"). The soil of the MFc has a similar water balance as the soil of QuAs. Apparently, due to the slope exposure, biologically favorable, the beech is not damaged there.

6. Characteristic differences were noted in the nitrogen supply, whereas in the QuAs and MFb ammonification takes place (up to 70 mg NH^4+-Nak/100 g dry weight by incubation during 6 weeks in the humidity chamber, there is only nitrification in the MFc.

In the MFb ammonification and nitrification are equal. In the QuAs the content of organic matter and nitrogen supply is optimal. The C/N relation however shows no difference. Therefore nitrogen supply is optimal in the QuAs, minimal in the MFc A vague relationship

between ammonification, nitrification respectively and exchangeable aluminum may be recognized; with increasing Al-content, nitrification decreases, ammonification augments. The calculation of mean values for some species, in relation to experimental areas with or without a particular species to be studied, showed a clear correlation between Oxalis acetosella, Pleurozium schreberi respectively, and Nak and Ntot.

7. Mineral substances (lactate soluble phosphate and potassium) show no distinct differences in the mineral soil of the three investigated units, nor can the cation exchange capacity be used for the characterisation. On the other hand the quantity of exchangeable H-ions and S-value and therefore also the base saturation degree in QuAs and MFb are very small, whereas they are considerably higher in the MFc. P- and K-supply is also insignificant at the period of the sample collecting in autumn. But it might be definitely higher in raw humus and mould (slightly decomposed humus, in German "Moder").

8. The attempt to evaluate for each of the three vegetation units and for each transition area of each transect mean values of a series of soil factors, resulted in a distinct critical value which has to be over-, respectively undergressed to permit the formation of the one or the other vegetation unit. Within the transects different kinds of regression curves can be expected, whereby straight lines of a certain inclination preferably occure in the transect between QuAs and MFb, neutralisation- and binominal-curves in the transect between QuAs and MFc.

9. It can be concluded, that the Querco-Abietetum sphagnetosum differs mainly by the water economy (relation) from the adjacent Melico-Fagetum. This and the diversity in stocking might be the secondary reason for the diversity of the other soil factors.