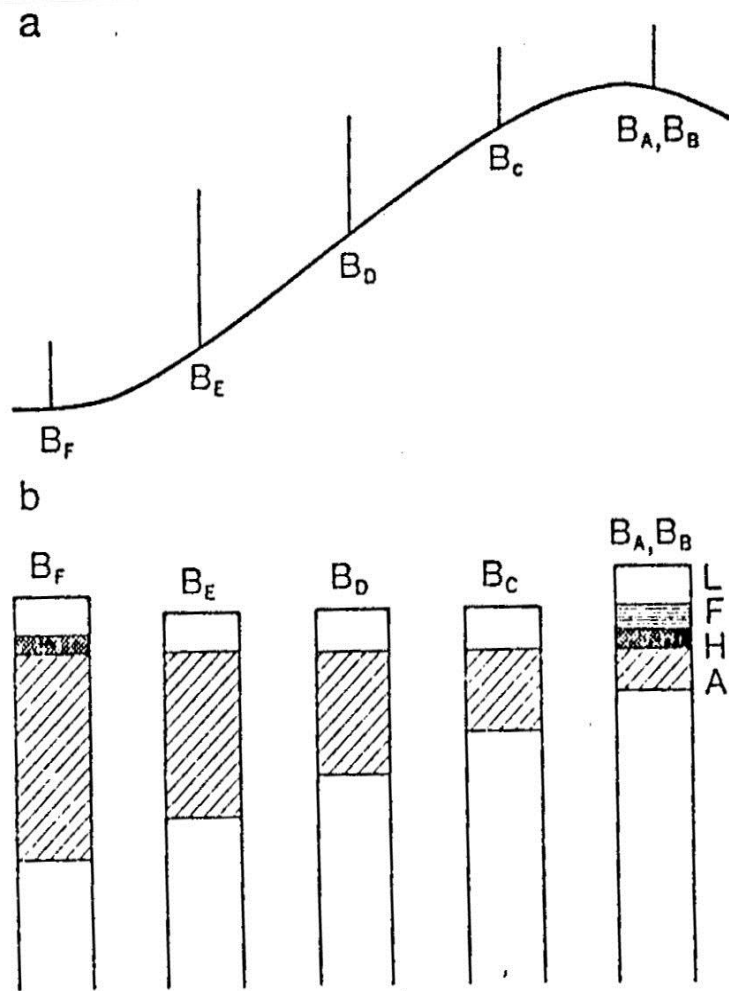# Soil Organic Matter
Its Characteristics and Roles in Agricultural Environments
Part 2

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a

B_A, B_B

B_C

B_D

B_E

B_F

b

B_A, B_B

B_F B_E B_D B_C

L
F
H
A

Schematic representation of soil types (B_A—B_F) of Brown forest soil. a: topographic location; b: A_0 and A horizons. Vertical lines indicate growth of the tree.

Red pine forest
(Yaotsu, Gifu prefecture)
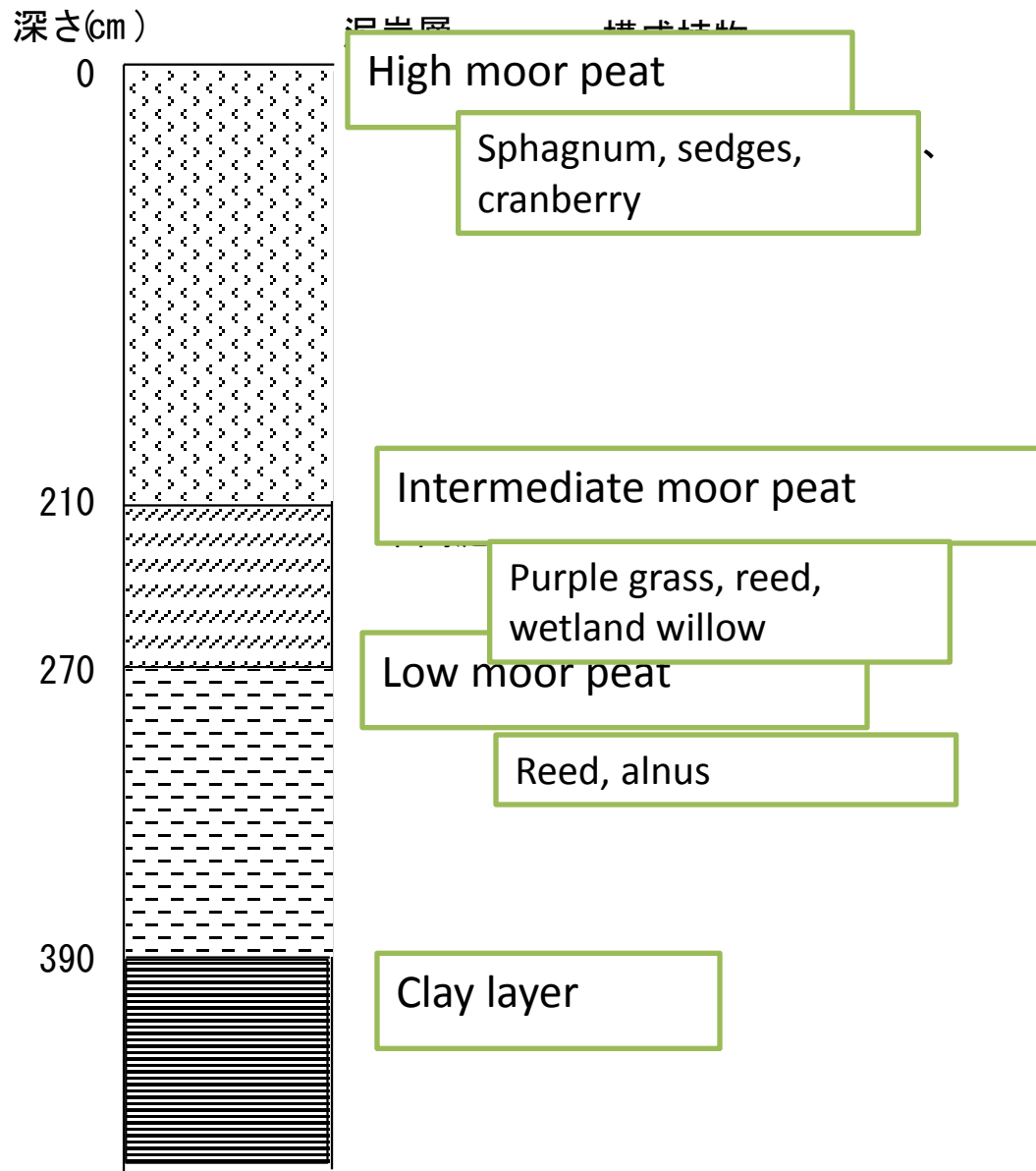
Brown forest soil B$_B$ type（Yaotsu, Gifu）
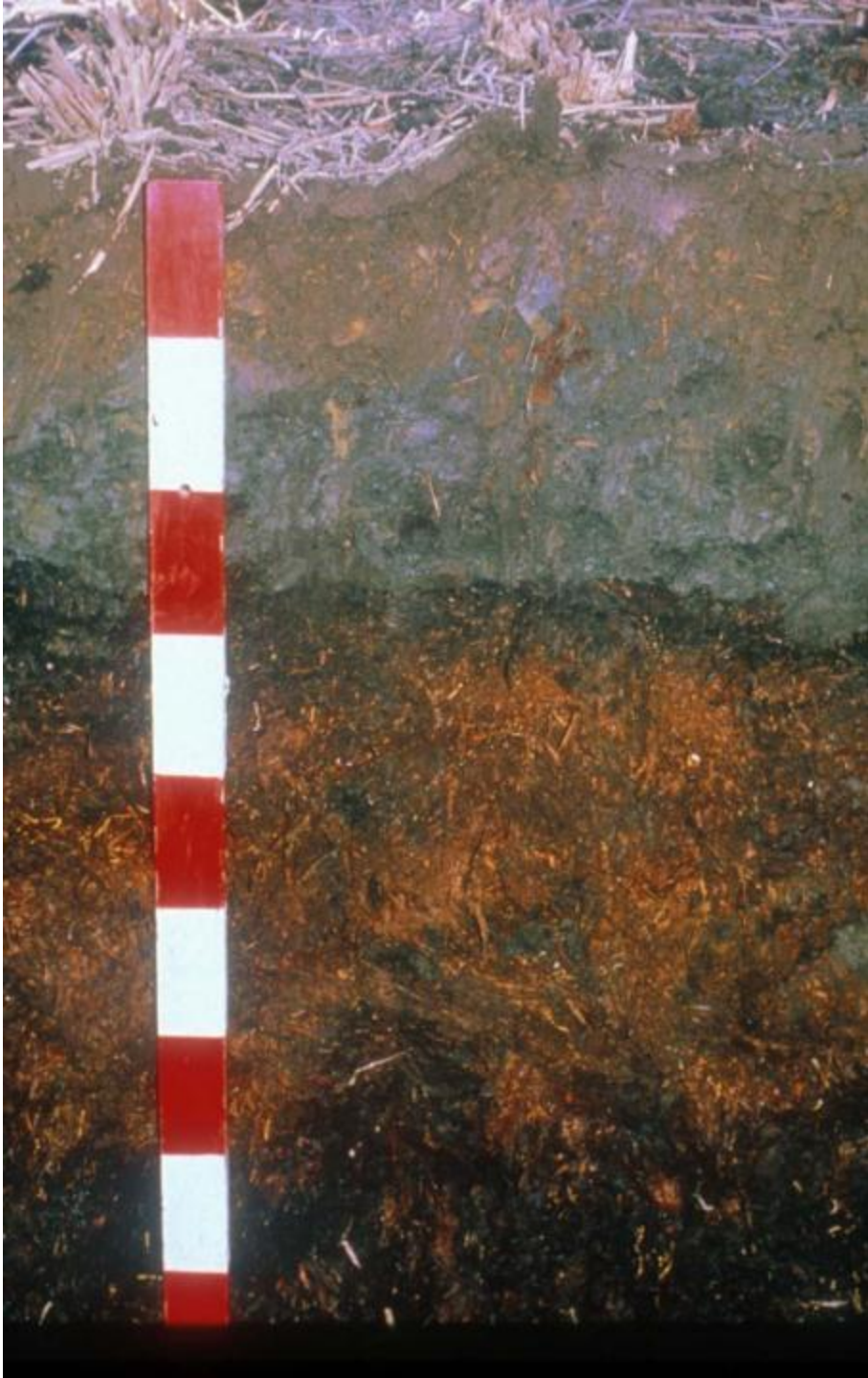
Litter layer of forest soil（O, A$_0$ layer）

Peat soil in Bibai

深さ(cm)

| 0 |
| 210 |
| 270 |
| 390 |

High moor peat

Sphagnum, sedges, cranberry

Intermediate moor peat

Purple grass, reed, wetland willow

Low moor peat

Reed, alnus

Clay layer

High moor peat soil profile in Bibai

Peat soil with dressed soil
（Nanporo town）

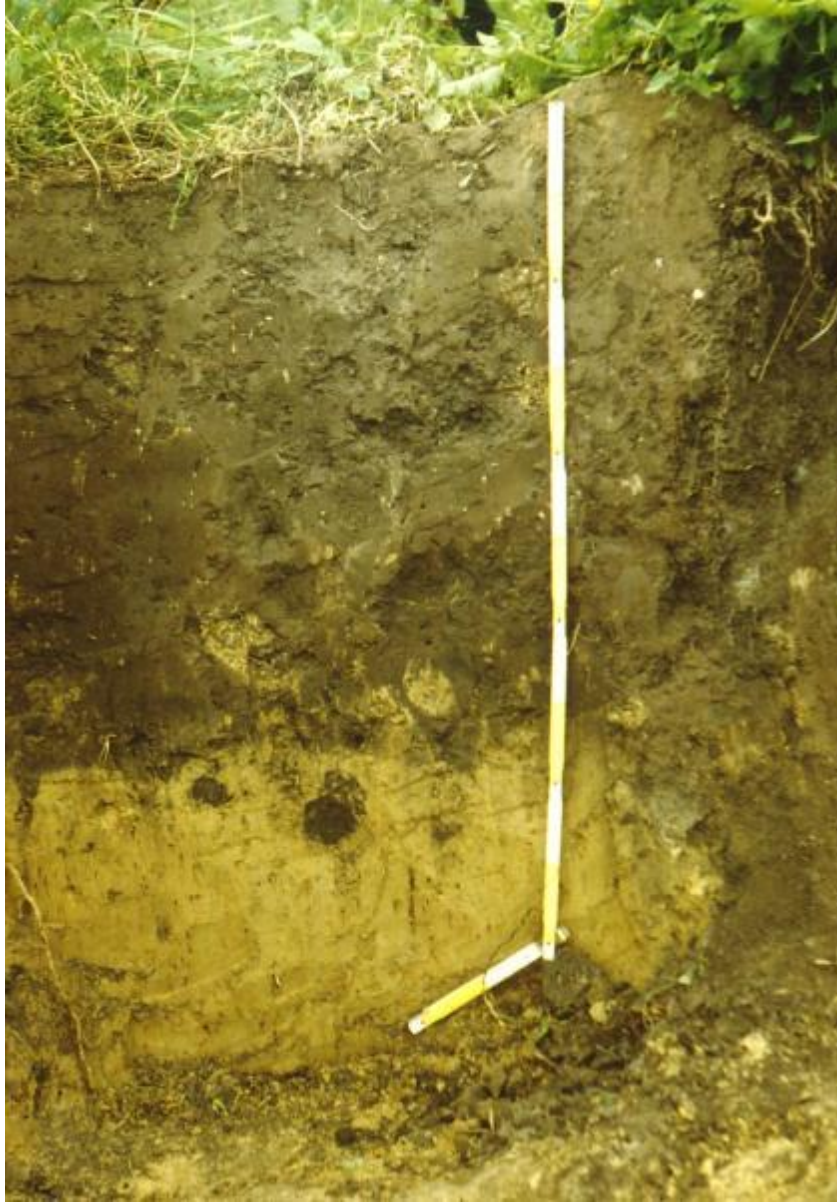# Asel forest near Hildesheim, Germany

Black soil in Asel forest, Germany

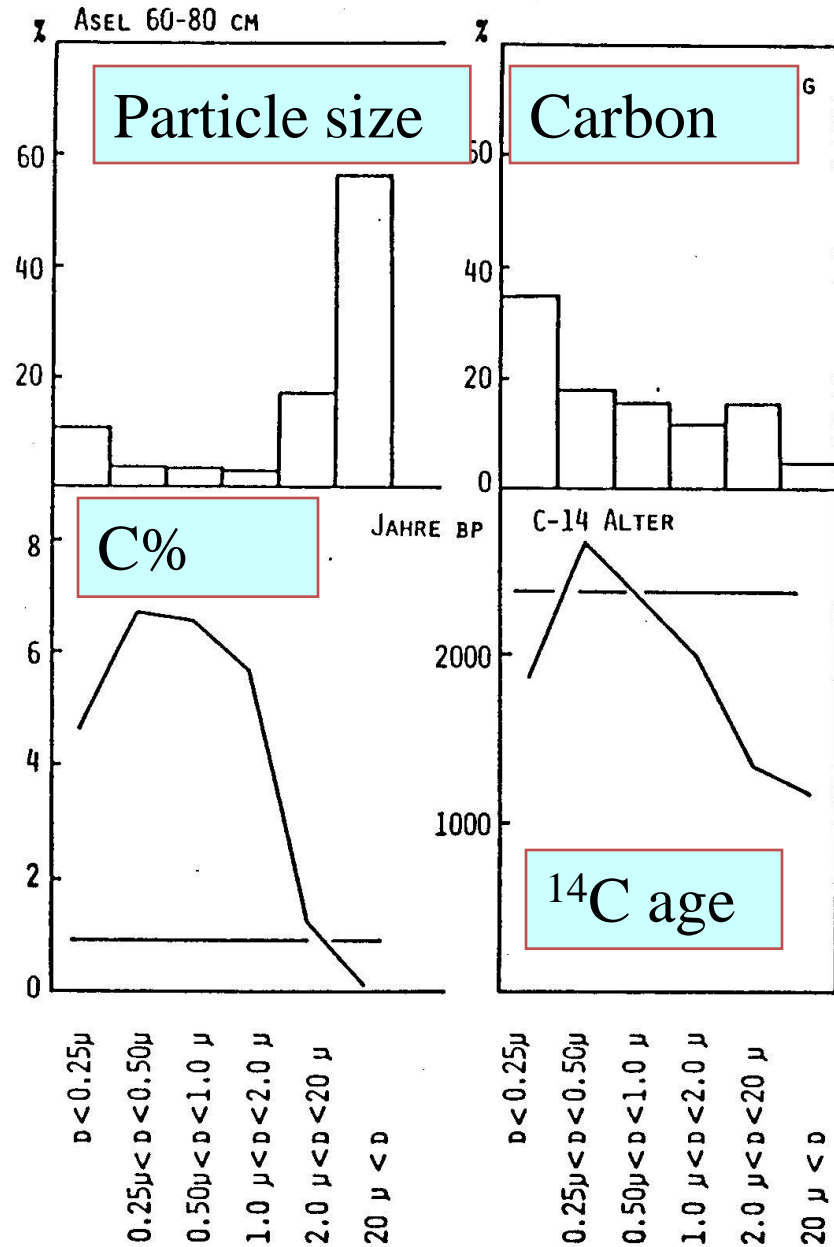# Wheat field in Soellingen/Germany

Black soil in Soellingen upland field

Soil organic matter stabilization on different size of soil particles

Organic matter bound to clay lasts long in soil

Stabilization and abundance of organic matter constituents in soil

Constituents			Abbreviation	Mean Residence Time	S (kg)	A_0 (kg)
Fresh organic matter (yearly imput)						1000
Decomposable Plant Material			DPM	1	10	10
Refractory Plant Material			RPM	3.9	470	120
Biomass			BIO	25.9	280	10.8
Physically stabilized organic matter			POM	94.8	11.3×10^3	119
Chemically stabilized organic matter			COM	2565	12.2×10^3	4.76
Whole Soil Organic Matter			SOM	1334	24.3×10^3	265

Jenkinson and Rayner, Soil Scinece 123, 6, 1977

S (kg) : Expected accumulation of organic matter after 10000 years

when 1000kg ha^{-1} of fresh organic matter is incorporated every year.

A_0 (kg) : Yearly gain of soil organic matter   (kg ha^{-1}) ,

Calculated from S and meanage. A_0 = S/Average Age

Accumulation of organic matter in soil

$$S = (1/\log_e 2)\, A_0\, H$$
$$= 1.44\, A_0\, H$$

S: Accumulated amount of organic matter after infinite years

A_0: Added amount of organic matter in one year

H: Half life of organic matter

1.44H: Mean residence time