Type 18: Small loess and loam-dominated lowland rivers

Distribution in river landscapes and regions according to Briem (2003):

Loess regions, ground moraines

Picture:

Hövenbach (North Rhine-Westphalia). Photograph: T. Timm

Short description of morphology:

In irregular curves, the river runs sinuous to meandering in a u-shaped valley. Very striking stream type. The loess and loam-dominated lowland stream is naturally the deepest cut-in stream type. The virtually vertical banks are undercut along eroding margins, but are stable because of the high bonding capacity of the loess fraction. On the streambed, the fine material is continuously removed and remains suspended in the current, often giving the streams a milky white colour (white water streams). The fine clastic substrate tends to form loam aggregates. In marl regions of the catchment, marl can be incorporated in the aggregates. The often flat aggregrates replace hard substrates in the channel and supplement the dominating fine fractions. This stream type is characteristic for the loess region, but is also found as loam-rich variants in regions of the ground moraines. The steep, deeply cut-in channel profile, and the development of impermeable silt and clay horizons in the channel bed and floodplain are comparable to those of loess-dominated streams. However, this variant often also shows patches of deposited or incorporated gravel. The milky white turbidity common of loess streams is rare in loam-dominated variant.

Abiotic profile:

Size class:	10 - 100 km² catchment area
Slope of the valley floor:	2 - 12 ‰
Flow category:	even flow pattern; aggregate “hard substrate” occur, alternation of deep, slowly flowing sections and shallow quickly flowing reaches, similar to coarse material streams
Channel substrates:	silt and clay fractions dominate, limited organic proportions, often loam aggregates, marl rocks, gravel

Physico-chemical water conditions:

calcareous

Conductivity [µS/cm]: 450 - 750
pH-value: 7,0 - 8,2
Alkalinity [°dH]: 10 - 20
Total hardness [°dH]: 14 - 28

Flow regime & hydrology:

Little to high fluctuations in discharge over the year; small streams have a tendency to intermittent surface discharge (summer dry).

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Characterisation of the macroinvertebrate community:

Functional groups: Depending on stream size, different shares of individual rhithral groups occur. Hard loam aggregates offer alternative "hard" substrates for gravel and stone-dwelling species. In fine sediments inhabitants of sand and mud habitats are common. The high load of fine suspended mineral material in the water column is unfavourable for many demanding species. Species diversity is low.

Selection of type-specific species: *Siphlonurus spec., Metreletus balcanicus* (in intermittent, summer dry streams), otherwise comparable communities to those of gravel-dominated streams, due to carbonate richness and formation of loam aggregates as alternatives for hard substrates.

Characterisation of macrophyte and pyhtobenthos communities:

As a result of permanent turbidity, the aquatic vegetation is sparse. Plants with floating leaves like the pondweed *Potamogeton pectinatus* are supported as a result of their growth form.

Characterisation of the fish fauna:

The very specific habitat conditions do not support a very diverse or abundant fish fauna. The stream type specific turbidity and lacking substrates suitable for spawning, usually limit the occurrence of demanding species like trout, which require high oxygen saturation levels and gravel beds. Typical are species, which spawn among macrophytes, however these only occur in low abundances. Often these streams are only inhabited by sticklebacks.

Comments:

As a result of the deeply incised stream channel, the highly bonding steep banks and the turbid water, the stream type is very distinct. In the present landscape the stream type is rarely found in near-natural conditions, because the soils where it occurs are very rich and subject to intensive agricultural use. Only in some forested regions do small, near-natural streams remain.

Examples of typical streams

Macroinvertebrates: Hövenbach (intermittent, summer dry) (North Rhine-Westphalia), Ahse (North Rhine-Westphalia), Eschbach, Holtorfer Bach, Siede (Lower Saxony)
Macrophytes and phytobenthos: Ahse (North Rhine-Westphalia)

Comparative literature (selection):

LUA NRW (1999) „Löss-lehmgeprägtes Fließgewässer der Bördenlandschaften", RASPER (2001) „Löss-/Lehmgeprägtes Fließgewässer des Tieflandes (mit Börden)", SOMMERHÄUSER & SCHUHMACHER (2003)