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## The effects of riparian forestry on invertebrate drift and brown trout in upland streams of contrasting acidity

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**Abstract.** Variations in macroinvertebrate drift and benthic invertebrate abundance were assessed in 30 upland Welsh streams of varying acidity (pH < 5.7 or pH > 6.0) and riparian land-use (conifer, moorland or native broadleaf). The consequences for the diet and condition of wild brown trout *Salmo trutta* were also assessed. As expected from previous studies, there were significant reductions in benthic invertebrate abundance, aquatic drift density (by >60%), aquatic drift biomass (by >35%), total drift density (by >35%) and total drift biomass (by >20%) at acid sites by comparison with circumneutral sites due largely to the scarcity of mayflies. Absolute drift from terrestrial sources was unrelated to stream pH but formed a significantly greater proportion of total drift at acid sites (30-65% of density) than at circumneutral sites (20-40%) as aquatic contributions declined. Most of this apparent land use effect reflected significantly increased terrestrial drift under broadleaves. There was no significant reduction in terrestrial or aquatic drift at conifer forest sites *per se* after accounting for low pH. Trout diet varied substantially between locations partly reflecting variations in drift: significantly fewer mayflies and stoneflies were eaten at acid sites, and significantly more terrestrial prey were eaten under broadleaves. However, acidity did not reduce trout condition or gut-fullness. Unexpectedly, trout condition was significantly enhanced at conifer sites, irrespective of their pH. Hence, acidity has greater effects on the benthic abundance and drift density of invertebrates in upland streams than does riparian land use. However, trout forage flexibly enough to offset any possible food deficit, for example by switching to chironomids and terrestrial invertebrates. Enhanced terrestrial contributions to invertebrate drift from riparian broadleaf trees may be important in supplementing foraging opportunities for trout where aquatic prey are scarce. These data illustrate the value of native tree species in riparian locations in upland Britain and the energy subsidy they provide might well be disproportionately important for otherwise impoverished acid streams

Keywords: brown trout, land-use, acidification, drift, forestry, streams

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