**TABLE S1** | Study locations, biomes and its corresponding references.

| Study | Biome | Latitude | Longitude | References |
|---|---|---|---|---|
| 1 | Cerrado | -15.9329 | -47.884 | Leite *et al.* (2015) |
| 2 | Cerrado | -15.7186 | -48.0138 | Schneider *et al.* (2011) |
| 3 | Cerrado | -14.4367 | -48.5814 | Mazzoni *et al.* (2010) |
| 4 | Cerrado | -11.888 | -52.2246 | Carmo (2013) |
| 5 | Amazon | -2.12737 | -59.3277 | Silva (2006) |
| 6 | Cerrado | -15.58 | -52.3067 | Melo *et al.* (2004) |
| 7 | Atlantic Forest | -19.0248 | -40.2295 | Machado (2017) |
| 8 | Cerrado | -15.934 | -56.0369 | Corrêa *et al.* (2011) |
| 9 | Atlantic Forest | -18.2261 | -40.0756 | Nascimento (2019) |
| 10 | Atlantic Forest | -23.3643 | -52.0189 | Silva (2013) |
| 11 | Atlantic Forest | -25.1621 | -53.8295 | Baldasso *et al.* (2019) |
| 12 | Amazon | -3.08246 | -59.7675 | Mérona, Rankin-de-Mérona (2004) |
| 13 | Atlantic Forest | -23.8382 | -54.349 | Lopes *et al.* (2016) |
| 14 | Atlantic Forest | -23.256 | -46.9613 | Rolla *et al.* (2009) |
| 15 | Atlantic Forest | -25.365 | -48.8321 | Wolff *et al.* (2013) |
| 16 | Atlantic Forest | -25.5461 | -53.2977 | Delariva *et al.* (2013) |
| 17 | Atlantic Forest | -23.5365 | -51.7831 | Silva *et al.* (2012) |
| 18 | Atlantic Forest | -25.08 | -53.6242 | Neves *et al.* (2015) |
| 19 | Atlantic Forest | -22.5984 | -52.2459 | Casatti (2002) |
| 20 | Cerrado | -21.2666 | -44.059 | Gandini *et al.* (2012) |
| 21 | Cerrado | -20.6853 | -53.5437 | Silva *et al.* (2017) |
| 22 | Cerrado | -22.0035 | -53.8057 | Brandão-Gonçalves *et al.* (2010) |
| 23 | Atlantic Forest | -22.8022 | -45.4489 | Andrade (2004) |
| 24 | Atlantic Forest | -22.5156 | -47.6706 | Rondineli (2007) |
| 25 | Atlantic Forest | -23.3234 | -51.8903 | Bonato *et al.* (2012) |
| 26 | Cerrado | -12.1667 | -47.75 | Pereira (2010) |
| 27 | Cerrado | -9.43333 | -50.1667 | Pereira (2010) |
| 28 | Cerrado | -11.7833 | -48.6167 | Pereira *et al.* (2007) |
| 29 | Atlantic Forest | -23.3197 | -51.1964 | Oliveira, Bennemann (2005) |
| 30 | Atlantic Forest | -23.6374 | -45.8131 | Esteves *et al.* (2008) |
| 31 | Cerrado | -21.3003 | -56.4355 | Romero (2011) |
| 32 | Amazon | -9.23588 | -56.9429 | Dary *et al.* (2017) |
| 33 | Atlantic Forest | -28.7068 | -52.8734 | Bonato *et al.* (2017) |
| 34 | Amazon | -3.56246 | -54.8903 | Cardoso, Couceiro (2017) |
| 35 | Atlantic Forest | -24.4166 | -47.25 | Gonçalves *et al.* (2018) |
| 36 | Atlantic Forest | -23.3965 | -51.8506 | Silva (2013) |
| 37 | Atlantic Forest | -20.7951 | -51.5146 | Luiz *et al.* (1998) |
| 38 | Atlantic Forest | -18.1388 | -40.0213 | Silva (2019) |
| 39 | Cerrado | -15.1032 | -49.4467 | Mello (2019) |
| 40 | Cerrado | -18.6031 | -51.953 | Aloisio (2006) |
| 41 | Cerrado | -13.1558 | -49.1653 | Sales (2015) |
| 42 | Atlantic Forest | -20.75 | -49.3333 | Rocha *et al.* (2009) |
| 43 | Amazon | -4.33037 | -49.5653 | Mérona *et al.* (2001) |
| 44 | Atlantic Forest | -23.7333 | -45.85 | Esteves, Lobon-Cervia (2001) |
| 45 | Amazon | -4.73313 | -62.1543 | Duarte *et al.* (2019) |
| 46 | Atlantic Forest | -23.5334 | -52.0185 | Garcia (2019) |
| 47 | Atlantic Forest | -23.3847 | -51.947 | Mise (2012) |
| 48 | Atlantic Forest | -20.5761 | -47.785 | Brambilla *et al.* (2019) |
| 49 | Cerrado | -20.685 | -56.7783 | Fuentes (2011) |

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**TABLE S2** | Classes of land use anthropic impact in a 500-meter buffer on each local network. P (pasture); APC (annual and perennial culture); SPC (semi perennial culture); MAP (Mosaic of cropland and pasture); UI (urban infrastructure); ANVA (another non-vegetated area); PF (planted forest).

| Study | P | APC | SPC | MAP | UI | ANVA | PF |
|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 43.9483 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 0 | 82.31511 | 0 | 7.181136 | 0 | 0 | 0 |
| 6 | 80.66667 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 7.075472 | 0 | 0 | 0 |
| 8 | 3.912543 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 66.89655 | 0 | 0 | 20.45977 | 0 | 0 | 0 |
| 10 | 4.282407 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13 | 58.60963 | 8.128342 | 0 | 25.5615 | 0 | 0 | 0 |
| 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | 15.20165 | 0 | 0 | 2.895553 | 0 | 0 | 0 |
| 17 | 9.195402 | 65.4023 | 0 | 23.21839 | 0 | 0 | 0 |
| 18 | 12.73533 | 9.634551 | 0 | 21.70543 | 0 | 0 | 0 |
| 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 | 70.72626 | 0 | 0 | 4.022346 | 0 | 0 | 18.10056 |
| 21 | 27.73019 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22 | 99.5785 | 0 | 0 | 0.421496 | 0 | 0 | 0 |
| 23 | 26.44444 | 0 | 0 | 28.11111 | 0 | 0 | 0.222222 |
| 24 | 9.237875 | 1.732102 | 65.35797 | 23.67206 | 0 | 0 | 0 |
| 25 | 25.73363 | 60.72235 | 0 | 12.86682 | 0 | 0 | 0 |
| 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 28 | 0 | 0 | 0 | 0 | 0 | 4.508671 | 0 |
| 29 | 5.995717 | 6.102784 | 0 | 41.64882 | 39.93576 | 0 | 0 |
| 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31 | 51.08324 | 0 | 0 | 0 | 0 | 0 | 0 |
| 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 33 | 0.913242 | 67.57991 | 0 | 6.621005 | 0 | 0 | 0 |
| 34 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 35 | 0 | 0 | 0 | 0.222222 | 0 | 0 | 0 |
| 36 | 5.989305 | 52.62032 | 0 | 29.94652 | 0 | 0 | 0 |
| 37 | 69.95662 | 0 | 0 | 13.88286 | 0 | 0 | 0 |
| 38 | 1.194743 | 78.01673 | 0 | 11.23059 | 0 | 0 | 4.181601 |
| 39 | 38.8009 | 3.054299 | 9.728507 | 0 | 0 | 0 | 0 |
| 40 | 38.27581 | 5.658085 | 0 | 0 | 0 | 1.603977 | 0 |
| 41 | 63.90728 | 0 | 0 | 0 | 0 | 0 | 0 |
| 42 | 90.90909 | 0 | 0 | 7.134638 | 0 | 0 | 0 |
| 43 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 44 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 45 | 0.493093 | 0 | 0 | 0 | 0 | 0 | 0 |
| 46 | 0.446429 | 71.79236 | 0 | 3.106803 | 0 | 0 | 0 |
| 47 | 6.417756 | 56.34418 | 2.125261 | 12.90419 | 14.67073 | 0.054549 | 0.089954 |
| 48 | 3.026906 | 5.381166 | 47.98206 | 0 | 0 | 0 | 0 |
| 49 | 21.71123 | 0 | 0 | 0 | 0 | 0 | 0 |

**TABLE S3 |** Percentage of species belonging to each trophic guild across local food webs. Trophic guilds are categorized according to their predominant food resources: invertivores (feed on terrestrial and aquatic insects), detritivores (feed on organic debris), herbivores (feed on plant material), algivores (feed on algae), piscivores (feed on fish), and omnivores (consume a combination of these resources).

| Study | Omnivores | Invertivores | Detritivores | Herbivores | Algivores | Piscivores |
|---|---|---|---|---|---|---|
| 1 | 0.50 | 0.13 | 0.25 | 0.00 | 0.00 | 0.13 |
| 2 | 0.23 | 0.46 | 0.15 | 0.08 | 0.00 | 0.00 |
| 3 | 0.18 | 0.53 | 0.29 | 0.00 | 0.00 | 0.00 |
| 4 | 0.00 | 0.08 | 0.15 | 0.00 | 0.08 | 0.54 |
| 5 | 0.00 | 0.78 | 0.22 | 0.00 | 0.00 | 0.00 |
| 6 | 0.07 | 0.45 | 0.20 | 0.18 | 0.04 | 0.04 |
| 7 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8 | 0.10 | 0.33 | 0.18 | 0.08 | 0.00 | 0.31 |
| 9 | 0.00 | 0.20 | 0.00 | 0.20 | 0.60 | 0.00 |
| 10 | 0.06 | 0.38 | 0.19 | 0.13 | 0.00 | 0.25 |
| 11 | 0.00 | 0.78 | 0.22 | 0.00 | 0.00 | 0.00 |
| 12 | 0.07 | 0.33 | 0.15 | 0.21 | 0.07 | 0.17 |
| 13 | 0.15 | 0.31 | 0.38 | 0.08 | 0.08 | 0.00 |
| 14 | 0.36 | 0.45 | 0.14 | 0.05 | 0.00 | 0.00 |
| 15 | 0.00 | 0.53 | 0.33 | 0.07 | 0.00 | 0.07 |
| 16 | 0.06 | 0.39 | 0.06 | 0.28 | 0.00 | 0.22 |
| 17 | 0.07 | 0.50 | 0.29 | 0.14 | 0.00 | 0.00 |
| 18 | 0.29 | 0.57 | 0.14 | 0.00 | 0.00 | 0.00 |
| 19 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 20 | 0.19 | 0.13 | 0.23 | 0.35 | 0.00 | 0.10 |
| 21 | 0.00 | 0.57 | 0.00 | 0.43 | 0.00 | 0.00 |
| 22 | 0.43 | 0.00 | 0.29 | 0.14 | 0.14 | 0.00 |
| 23 | 0.00 | 0.70 | 0.10 | 0.10 | 0.00 | 0.10 |
| 24 | 0.06 | 0.82 | 0.06 | 0.00 | 0.00 | 0.06 |
| 25 | 0.18 | 0.71 | 0.06 | 0.00 | 0.00 | 0.06 |
| 26 | 0.00 | 0.70 | 0.10 | 0.10 | 0.05 | 0.05 |
| 27 | 0.14 | 0.68 | 0.00 | 0.03 | 0.14 | 0.03 |
| 28 | 0.10 | 0.68 | 0.16 | 0.00 | 0.00 | 0.06 |
| 29 | 0.57 | 0.00 | 0.29 | 0.00 | 0.14 | 0.00 |
| 30 | 0.13 | 0.47 | 0.40 | 0.00 | 0.00 | 0.00 |
| 31 | 0.00 | 0.67 | 0.22 | 0.00 | 0.11 | 0.00 |
| 32 | 0.09 | 0.35 | 0.03 | 0.23 | 0.05 | 0.26 |
| 33 | 0.27 | 0.45 | 0.00 | 0.09 | 0.00 | 0.18 |
| 34 | 0.05 | 0.90 | 0.00 | 0.05 | 0.00 | 0.00 |
| 35 | 0.05 | 0.70 | 0.25 | 0.00 | 0.00 | 0.00 |
| 36 | 0.00 | 0.33 | 0.33 | 0.33 | 0.00 | 0.00 |
| 37 | 0.10 | 0.29 | 0.35 | 0.10 | 0.03 | 0.13 |
| 38 | 0.00 | 0.71 | 0.00 | 0.00 | 0.29 | 0.00 |
| 39 | 0.00 | 0.00 | 0.33 | 0.33 | 0.00 | 0.17 |
| 40 | 0.00 | 0.50 | 0.00 | 0.17 | 0.00 | 0.33 |
| 41 | 0.00 | 0.64 | 0.29 | 0.07 | 0.00 | 0.00 |
| 42 | 0.17 | 0.58 | 0.17 | 0.00 | 0.00 | 0.00 |
| 43 | 0.24 | 0.27 | 0.21 | 0.15 | 0.03 | 0.25 |
| 44 | 0.14 | 0.36 | 0.43 | 0.00 | 0.00 | 0.07 |
| 45 | 0.39 | 0.39 | 0.00 | 0.17 | 0.00 | 0.00 |
| 46 | 0.00 | 0.50 | 0.37 | 0.12 | 0.00 | 0.00 |
| 47 | 0.00 | 0.86 | 0.06 | 0.06 | 0.00 | 0.00 |
| 48 | 0.22 | 0.33 | 0.33 | 0.11 | 0.11 | 0.00 |
| 49 | 0.00 | 0.66 | 0.22 | 0.00 | 0.11 | 0.00 |
| **Mean** | **0.11** | **0.49** | **0.17** | **0.09** | **0.04** | **0.07** |

**TABLE S4** | Network descriptors used in the study. Network metrics follow May, 1973; Tilman, 1996; Dunne *et al.*, 2002b; Almeida-Neto *et al.*, 2008; Stouffer, Bascompte, 2011.

| Study | Nestedness (NODF) | Modularity (Q) | Specialization (H2') | Connectance | Number of links | Link density | Completeness | Number of species |
|---|---|---|---|---|---|---|---|---|
| 1 | 59.29 | 0.2 | 0.29 | 0.47 | 21.41 | 13.08 | 0.47 | 8 |
| 2 | 34.43 | 0.15 | 0.43 | 0.6 | 24.07 | 16.69 | 0.6 | 13 |
| 3 | 20.17 | 0.36 | 0.53 | 0.45 | 3.78 | 6.85 | 0.45 | 17 |
| 4 | 5.66 | 0.65 | 0.99 | 0.17 | 1.78 | 2.5 | 0.17 | 13 |
| 5 | 52.16 | 0.13 | 0.52 | 0.76 | 5.75 | 6.48 | 0.76 | 9 |
| 6 | 31.82 | 0.19 | 0.66 | 0.45 | 5.99 | 21.17 | 0.45 | 71 |
| 7 | 18.44 | 0.48 | 0.82 | 0.27 | 4.81 | 3.76 | 0.27 | 6 |
| 8 | 25.71 | 0.23 | 0.73 | 0.4 | 4.11 | 12.01 | 0.4 | 39 |
| 9 | 16.77 | 0.29 | 0.83 | 0.44 | 6.76 | 4.97 | 0.37 | 5 |
| 10 | 27.49 | 0.3 | 0.65 | 0.28 | 6.94 | 9.61 | 0.28 | 31 |
| 11 | 45.73 | 0.14 | 0.5 | 0.61 | 12.64 | 9.36 | 0.61 | 9 |
| 12 | 19.62 | 0.27 | 0.65 | 0.34 | 5.22 | 18.19 | 0.34 | 75 |
| 13 | 29.4 | 0.2 | 0.67 | 0.57 | 3.49 | 5.57 | 0.57 | 13 |
| 14 | 49.25 | 0.14 | 0.42 | 0.66 | 8.52 | 13.01 | 0.66 | 22 |
| 15 | 38.71 | 0.2 | 0.74 | 0.58 | 5.14 | 7.6 | 0.58 | 15 |
| 16 | 27.66 | 0.23 | 0.63 | 0.44 | 6.45 | 8.09 | 0.44 | 18 |
| 17 | 32.22 | 0.18 | 0.57 | 0.47 | 18.68 | 13.65 | 0.47 | 14 |
| 18 | 20.61 | 0.3 | 0.62 | 0.43 | 9 | 6.3 | 0.43 | 7 |
| 19 | 22.01 | 0.4 | 0.54 | 0.27 | 8.57 | 6.39 | 0.27 | 11 |
| 20 | 37.49 | 0.2 | 0.64 | 0.45 | 5.15 | 11.59 | 0.45 | 32 |
| 21 | 40.98 | 0.13 | 0.37 | 0.68 | 15.42 | 10.37 | 0.68 | 7 |
| 22 | 60.71 | 0.21 | 0.46 | 0.59 | 4.79 | 4.86 | 0.59 | 7 |
| 23 | 44.28 | 0.19 | 0.47 | 0.54 | 8.02 | 7.26 | 0.54 | 10 |
| 24 | 43.84 | 0.17 | 0.37 | 0.53 | 10.17 | 10.77 | 0.53 | 17 |
| 25 | 31.57 | 0.2 | 0.5 | 0.46 | 11.11 | 10 | 0.46 | 15 |
| 26 | 32.61 | 0.17 | 0.58 | 0.59 | 5.86 | 10.06 | 0.59 | 20 |
| 27 | 38.21 | 0.16 | 0.59 | 0.61 | 6.21 | 15.17 | 0.61 | 37 |
| 28 | 35.99 | 0.09 | 0.35 | 0.81 | 7.67 | 24.65 | 0.81 | 50 |
| 29 | 24.93 | 0.2 | 0.43 | 0.53 | 16.5 | 10.69 | 0.43 | 7 |
| 30 | 26.39 | 0.15 | 0.4 | 0.55 | 5.63 | 9.02 | 0.55 | 15 |
| 31 | 9.8 | 0.49 | 0.86 | 0.3 | 2.12 | 2.62 | 0.3 | 9 |
| 32 | 30.05 | 0.23 | 0.72 | 0.42 | 6.28 | 19.16 | 0.42 | 66 |
| 33 | 46.11 | 0.22 | 0.42 | 0.4 | 30.81 | 18.47 | 0.4 | 11 |
| 34 | 32.42 | 0.22 | 0.41 | 0.42 | 2.41 | 9.25 | 0.42 | 21 |
| 35 | 37.05 | 0.28 | 0.81 | 0.33 | 7.36 | 8.51 | 0.33 | 20 |
| 36 | 63.57 | 0.17 | 0.6 | 0.62 | 5.53 | 5.07 | 0.62 | 6 |
| 37 | 21.73 | 0.26 | 0.61 | 0.26 | 10.1 | 11.91 | 0.26 | 31 |
| 38 | 13.33 | 0.37 | 0.7 | 0.31 | 10.91 | 7.11 | 0.31 | 7 |
| 39 | 27.78 | 0.4 | 0.78 | 0.32 | 3.84 | 3.42 | 0.32 | 6 |
| 40 | 36.58 | 0.15 | 0.63 | 0.69 | 6.46 | 5.54 | 0.69 | 6 |
| 41 | 23.59 | 0.29 | 0.82 | 0.34 | 3.78 | 8.91 | 0.34 | 28 |
| 42 | 33.32 | 0.24 | 0.33 | 0.37 | 13.23 | 9.86 | 0.37 | 12 |
| 43 | 30.53 | 0.21 | 0.64 | 0.49 | 4.31 | 29.1 | 0.49 | 99 |
| 44 | 46.25 | 0.18 | 0.59 | 0.58 | 7.6 | 8.44 | 0.58 | 14 |
| 45 | 39.63 | 0.14 | 0.37 | 0.54 | 9.56 | 15.18 | 0.54 | 28 |
| 46 | 36.46 | 0.23 | 0.7 | 0.4 | 11.84 | 9.76 | 0.4 | 16 |
| 47 | 40.3 | 0.09 | 0.46 | 0.86 | 5.31 | 9.19 | 0.86 | 15 |
| 48 | 49.45 | 0.3 | 0.75 | 0.38 | 5.63 | 5.42 | 0.38 | 9 |
| 49 | 10.42 | 0.52 | 0.86 | 0.25 | 2.44 | 2.67 | 0.22 | 9 |

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**TABLE S5** | Pearson's correlation among the network descriptors.

| | Nestedness ($NODF_{zscore}$) | Modularity ($Q_{zscore}$) | Specialiation ($H_2'$) | Connectance | Number of Links | Number of species | Link density | Completeness |
|---|---|---|---|---|---|---|---|---|
| Nestedness ($NODF_{zscore}$) | 1 | -0.69 | -0.57 | 0.63 | 0.3 | -0.12 | 0.16 | 0.65 |
| Modularity ($Q_{zscore}$) | | 1 | 0.71 | -0.82 | -0.32 | -0.16 | -0.49 | -0.82 |
| Specialiation ($H_2'$) | | | 1 | -0.58 | -0.53 | 0.07 | -0.37 | -0.58 |
| Connectance | | | | 1 | 0.11 | -0.03 | 0.24 | 0.99 |
| Number of Links | | | | | 1 | -0.22 | 0.33 | 0.1 |
| Number of species | | | | | | 1 | 0.8 | -0.01 |
| Link density | | | | | | | 1 | 0.25 |
| Completeness | | | | | | | | 1 |

SUPPLEMENTARY MATERIAL

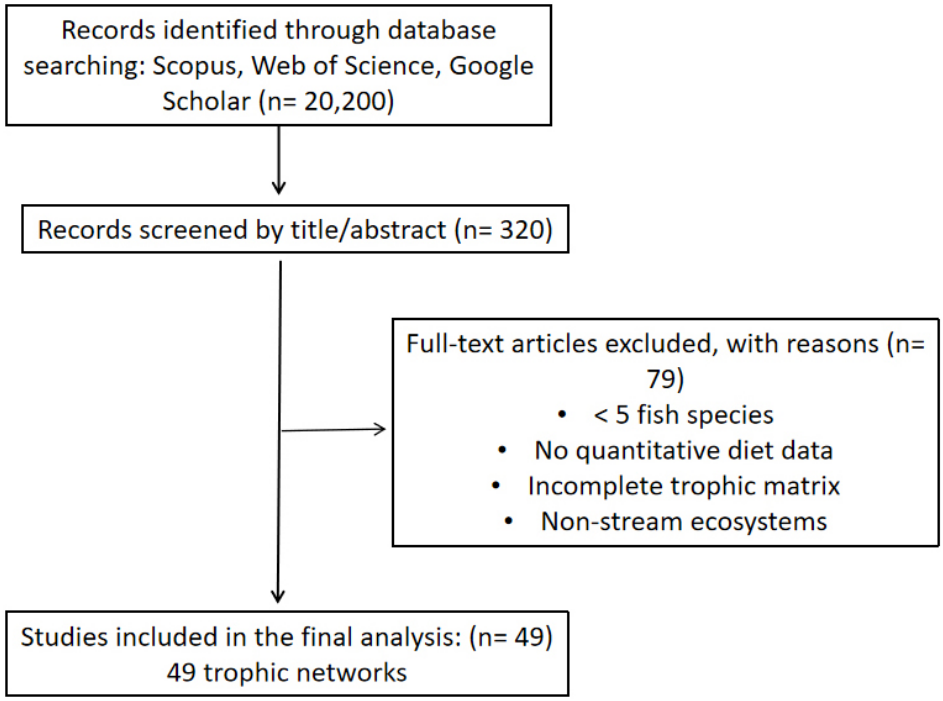


**FIGURE S6** | PRISMA flow diagram illustrating the systematic review process for selecting studies on trophic networks in stream ecosystems. A total of 20,200 records were identified through database searches (Scopus, Web of Science, and Google Scholar). After title and abstract screening, 320 records were retained and 271 further were excluded. Full-text screening was conducted for 128 articles, of which 79 were excluded for reasons such as including fewer than five fish species, lacking quantitative diet data, having incomplete trophic matrices, or focusing on non-stream ecosystems. The final analyses include 49 articles representing 49 trophic networks.

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