

Network rewiring conserves the topology of drought-impaired food webs

Supplementary Figures and Tables

Supplementary Table 1. Rewiring observed in all webs. For each drought web, the proportions of surviving species and unaltered links, which are nodes and links that are common to both webs, are listed. The proportion of rewired links in each drought web was calculated by referring to the surviving species only (Exc. Invasion), and by referring to all links including species that invaded the drought webs (All). The Jaccard Index among nodes and links between each web pair are also provided, together with the overall mean values and standard deviations (S.D.) across all webs.

web	Unaltered in drought web		Rewiring in drought web		The Jaccard index between web pairs	
	<i>Nodes</i>	<i>Links</i>	<i>Exc. Invasion</i>	<i>All</i>	<i>Nodes</i>	<i>Links</i>
1	0.91	0.58	0.32	0.42	0.32	0.62
2	0.87	0.48	0.36	0.52	0.42	0.79
3	0.92	0.69	0.12	0.31	0.31	0.67
4	0.96	0.66	0.17	0.34	0.25	0.66
Mean	0.92	0.60	0.24	0.40	0.33	0.69
S.D.	0.04	0.09	0.12	0.09	0.07	0.07

Supplementary Table 2. High level of topological similarity between control and drought web pairs. For each pair of webs, the mean S^3 scores from 30 runs are shown, together with the overall mean values and standard deviations (S.D.) across all webs. The mean S^3 scores between control and 30 randomised drought webs are also shown by comparing the results from the empirical webs with the null model. Note that the z-score indicates the number of standard deviations that the empirical webs lie from the mean of the randomisations.

Food web pair	Empirical webs		Empirical control and randomised drought webs		z-score
	S^3	S.D.	S^3	S.D.	
1	0.79	0.01	0.47	0.01	32
2	0.83	0.01	0.51	0.01	32
3	0.81	0.02	0.48	0.01	33
4	0.78	0.01	0.49	0.01	25
Mean	0.80	0.02	0.49	0.01	30.5

Supplementary Table 3. Species alignment in control and drought pair of webs 1. Species in the control web are grouped into aligned and non-aligned groups. Within a group, survived species (non-shaded) are listed first in ascending order of body mass, followed by extinct species (*shaded*) in the same order. Species in the drought web are listed against their counterpart species in the control web based on the network alignment results. An asterisk (*) denotes an invaded species.

Web pair 1	Species in control web	Trophic group	Aligned species in drought web	Trophic group
Aligned	Amorphus detritus	Detritus	Tubificidae	Detritivore
	Plant fragments	Detritus	<i>Cricotopus sp.</i>	Herbivore
	Fungal spores	Decomposer	<i>Heterotrissocladius sp.</i>	Detritivore
	<i>Hyphomycete fungal hyphae</i>	Decomposer	<i>Tinodes waeneri</i>	Herbivore
	<i>Chroococcus minor</i>	Primary producer	<i>Microtendipes sp.</i>	Herbivore
	<i>Psammothidium lauenburgianum</i>	Primary producer	<i>Cryptochironomus sp.</i>	Herbivore
	<i>Gomphonema olivaceum</i>	Primary producer	Naididae	Detritivore
	<i>Amphora pediculus</i>	Primary producer	<i>Ephemera danica</i>	Detritivore
	<i>Planothidium lanceolatum</i>	Primary producer	<i>Oulimnius tuberculatus</i>	Detritivore
	<i>Encyonema minutum</i>	Primary producer	<i>Limnius volckmari</i>	Detritivore
	<i>Gongrosira incrustans</i>	Primary producer	<i>Gammarus pulex</i>	Detritivore
	<i>Melosira varians</i>	Primary producer	<i>Radix balthica</i>	Herbivore
	<i>Cocconeis placentula</i>	Primary producer	<i>Baetis sp.</i>	Herbivore
	<i>Navicula menisculus</i>	Primary producer	<i>Pisidium sp.</i>	Detritivore
	<i>Nitzschia dissipata</i>	Primary producer	* <i>Eiseniella tetraedra</i>	Detritivore
	<i>Nitzschia perminuta</i>	Primary producer	<i>Macropelopia sp.</i>	Predator
	<i>Rhoicosphenia abbreviata</i>	Primary producer	<i>Potamopyrgus antipodarum</i>	Herbivore
	<i>Navicula tripunctata</i>	Primary producer	Simuliidae	Detritivore
	<i>Navicula lanceolata</i>	Primary producer	<i>Hydropsyche sp.</i>	Predator
	<i>Spirulina sp.</i>	Primary producer	* <i>Synorthocladius sp.</i>	Herbivore
	Naididae	Detritivore	<i>Chroococcus minor</i>	Primary producer
	<i>Oulimnius tuberculatus</i>	Detritivore	* <i>Staurosirella leptostauron</i>	Primary producer
	<i>Heterotrissocladius sp.</i>	Detritivore	<i>Gongrosira incrustans</i>	Primary producer
	Simuliidae	Detritivore	<i>Cocconeis placentula</i>	Primary producer
	Tubificidae	Detritivore	<i>Nitzschia perminuta</i>	Primary producer
	<i>Pisidium sp.</i>	Detritivore	Fungal spores	Decomposer
	<i>Gammarus pulex</i>	Detritivore	<i>Amphora pediculus</i>	Primary producer

	<i>Ephemera danica</i>	Detritivore	<i>Rhoicosphenia abbreviata</i>	Primary producer
	<i>Cricotopus sp.</i>	Herbivore	<i>Synedra ulna</i>	Primary producer
	<i>Cryptochironomus sp.</i>	Herbivore	<i>Surirella minuta</i>	Primary producer
	<i>Microtendipes sp.</i>	Herbivore	<i>Amorphus detritus</i>	Detritus
	<i>Tinodes waeneri</i>	Herbivore	<i>Navicula tripunctata</i>	Primary producer
	<i>Baetis sp.</i>	Herbivore	<i>Nitzschia dissipata</i>	Primary producer
	<i>Potamopyrgus antipodarum</i>	Herbivore	<i>Navicula menisculus</i>	Primary producer
	<i>Radix balthica</i>	Herbivore	<i>Gomphonema olivaceum</i>	Primary producer
	<i>Hydropsyche sp.</i>	Predator	<i>Navicula gregaria</i>	Primary producer
	<i>Amphora ovalis</i>	Primary producer	* <i>Sialis lutaria</i>	Predator
	<i>Cymatopleura solea</i>	Primary producer	* <i>Gyrosigma sp.</i>	Primary producer
	<i>Ostracoda</i>	Detritivore	<i>Encyonema minutum</i>	Primary producer
	<i>Leuctra geniculata</i>	Detritivore	<i>Psammothidium lauenburgianum</i>	Primary producer
	<i>Polypedilum sp.</i>	Detritivore	<i>Spirulina sp.</i>	Primary producer
	<i>Elmis aenea</i>	Detritivore	<i>Planothidium lanceolatum</i>	Primary producer
	<i>Asellus aquaticus</i>	Detritivore	<i>Melosira varians</i>	Primary producer
	<i>Sericostoma personatum</i>	Detritivore	<i>Navicula lanceolata</i>	Primary producer
	<i>Athripsodes sp.</i>	Herbivore	<i>Staurosira elliptica</i>	Primary producer
	<i>Brachycentrus subnubilus</i>	Herbivore	Plant fragments	Detritus
	<i>Ancylus fluviatilis</i>	Herbivore	<i>Hyphomycete fungal hyphae</i>	Decomposer
Non-aligned	<i>Staurosira elliptica</i>	Primary producer		
	<i>Surirella minuta</i>	Primary producer		
	<i>Navicula gregaria</i>	Primary producer		
	<i>Synedra ulna</i>	Primary producer		
	<i>Limnius volckmari</i>	Detritivore		
	<i>Macropelopia sp.</i>	Predator		
	<i>Fragilaria vaucheriae</i>	Primary producer		
	<i>Algal cysts</i>	Primary producer		
	<i>Diatoma vulgare</i>	Primary producer		
	<i>Brychius elevatus</i>	Herbivore		
	<i>Polycentropus flavomaculatus</i>	Predator		
	<i>Erpobdella octoculata</i>	Predator		

Supplementary Table 4. Species alignment in control and drought pair of webs 2. Species in the control web are grouped into aligned and non-aligned groups. Within a group, survived species (non-shaded) are listed first in ascending order of body mass, followed by extinct species (*shaded*) in the same order. Species in the drought web are listed against their counterpart species in the control web based on the network alignment results. An asterisk (*) denotes an invaded species.

Web pair 2	Species in control web	Trophic group	Aligned species in drought web	Trophic group
Aligned	Amorphus detritus	Detritus	* <i>Tipula montium</i>	Detritivore
	Plant fragments	Detritus	Naididae	Detritivore
	<i>Hyphomycete fungal hyphae</i>	Decomposer	<i>Macropelopia sp.</i>	Predator
	<i>Staurosira elliptica</i>	Primary producer	<i>Ephemera danica</i>	Detritivore
	<i>Gomphonema olivaceum</i>	Primary producer	<i>Gammarus pulex</i>	Detritivore
	<i>Amphora pediculus</i>	Primary producer	<i>Potamopyrgus antipodarum</i>	Herbivore
	<i>Encyonema minutum</i>	Primary producer	<i>Pisidium sp.</i>	Detritivore
	<i>Cocconeis placentula</i>	Primary producer	<i>Microtendipes sp.</i>	Herbivore
	<i>Navicula gregaria</i>	Primary producer	<i>Cryptochironomus sp.</i>	Herbivore
	<i>Rhoicosphenia abbreviata</i>	Primary producer	Tubificidae	Detritivore
	Algal cysts	Primary producer	<i>Synorthocladius sp.</i>	Herbivore
	<i>Navicula tripunctata</i>	Primary producer	<i>Radix balthica</i>	Herbivore
	<i>Amphora ovalis</i>	Primary producer	<i>Limnius volckmari</i>	Detritivore
	<i>Navicula lanceolata</i>	Primary producer	<i>Tinodes waeneri</i>	Herbivore
	<i>Cymatopleura solea</i>	Primary producer	<i>Procladius sp.</i>	Herbivore
	<i>Spirulina sp.</i>	Primary producer	<i>Asellus aquaticus</i>	Detritivore
	Tubificidae	Detritivore	<i>Staurosira elliptica</i>	Primary producer
	<i>Gammarus pulex</i>	Detritivore	<i>Hyphomycete fungal hyphae</i>	Decomposer
	<i>Pisidium sp.</i>	Detritivore	<i>Navicula lanceolata</i>	Primary producer
	<i>Asellus aquaticus</i>	Detritivore	<i>Chroococcus minor</i>	Primary producer
	<i>Ephemera danica</i>	Detritivore	Algal cysts	Primary producer
	<i>Synorthocladius sp.</i>	Herbivore	<i>Amphora ovalis</i>	Primary producer
	<i>Procladius sp.</i>	Herbivore	<i>Diatoma vulgare</i>	Primary producer
	<i>Cryptochironomus sp.</i>	Herbivore	<i>Surirella minuta</i>	Primary producer
	<i>Tinodes waeneri</i>	Herbivore	<i>Navicula tripunctata</i>	Primary producer

<i>Potamopyrgus antipodarum</i>	Herbivore	<i>Nitzschia perminuta</i>	Primary producer
<i>Radix balthica</i>	Herbivore	<i>Amorphus detritus</i>	Detritus
<i>Macropelopia sp.</i>	Predator	<i>Planothidium lanceolatum</i>	Primary producer
<i>Heterotrissocladius sp.</i>	Detritivore	<i>Navicula gregaria</i>	Primary producer
<i>Polypedilum sp.</i>	Detritivore	* <i>Surirella brebissonii</i>	Primary producer
Simuliidae	Detritivore	<i>Navicula menisculus</i>	Primary producer
<i>Elmis aenea</i>	Detritivore	<i>Nitzschia dissipata</i>	Primary producer
<i>Oulimnius tuberculatus</i>	Detritivore	* <i>Gyrosigma sp.</i>	Primary producer
<i>Sericostoma personatum</i>	Detritivore	<i>Gomphonema olivaceum</i>	Primary producer
<i>Cricotopus sp.</i>	Herbivore	<i>Cymatopleura solea</i>	Primary producer
<i>Athripsodes sp.</i>	Herbivore	<i>Spirulina sp.</i>	Primary producer
<i>Brachycentrus subnubilus</i>	Herbivore	Plant fragments	Detritus
<i>Brychius elevatus</i>	Herbivore	<i>Fragilaria vaucheriae</i>	Primary producer
<i>Ancylus fluviatilis</i>	Herbivore	<i>Melosira varians</i>	Primary producer
<i>Valvata piscinalis</i>	Herbivore	<i>Cocconeis placentula</i>	Primary producer
<i>Theodoxus fluviatilis</i>	Herbivore	<i>Amphora pediculus</i>	Primary producer
<i>Pentaneura sp.</i>	Predator	<i>Psammothidium lauenburgianum</i>	Primary producer
<i>Polycentropus flavomaculatus</i>	Predator	<i>Rhoicosphenia abbreviata</i>	Primary producer
<i>Hydropsyche sp.</i>	Predator	Fungal spores	Decomposer
<i>Haliplus lineatocollis</i>	Predator	<i>Encyonema minutum</i>	Primary producer
<i>Sialis lutaria</i>	Predator	<i>Gongrosira incrustans</i>	Primary producer
Non-aligned	Fungal spores		
	Decomposer		
<i>Chroococcus minor</i>	Primary producer		
<i>Psammothidium lauenburgianum</i>	Primary producer		
<i>Planothidium lanceolatum</i>	Primary producer		
<i>Gongrosira incrustans</i>	Primary producer		
<i>Melosira varians</i>	Primary producer		
<i>Navicula menisculus</i>	Primary producer		
<i>Surirella minuta</i>	Primary producer		
<i>Nitzschia dissipata</i>	Primary producer		

<i>Nitzschia perminuta</i>	Primary producer
<i>Fragilaria vaucheriae</i>	Primary producer
<i>Diatoma vulgare</i>	Primary producer
Naididae	Detritivore
<i>Limnius volckmari</i>	Detritivore
<i>Microtendipes sp.</i>	Herbivore
<i>Staurosirella leptostauron</i>	Primary producer
<i>Erpobdella octoculata</i>	Predator

Supplementary Table 5. Species alignment in control and drought pair of webs 3. Species in the control web are grouped into aligned and non-aligned groups. Within a group, survived species (non-shaded) are listed first in ascending order of body mass, followed by extinct species (*shaded*) in the same order. Species in the drought web are listed against their counterpart species in the control web based on the network alignment results. An asterisk (*) denotes an invaded species.

Web pair 3	Species in control web	Trophic group	Aligned species in drought web	Trophic group
Aligned	Amorphus detritus	Detritus	Tubificidae	Detritivore
	Plant fragments	Detritus	<i>Microtendipes sp.</i>	Herbivore
	Fungal spores	Decomposer	<i>Pisidium sp.</i>	Detritivore
	<i>Chroococcus minor</i>	Primary producer	<i>Baetis sp.</i>	Herbivore
	<i>Staurosira elliptica</i>	Primary producer	<i>Cricotopus sp.</i>	Herbivore
	<i>Psammothidium lauenburgianum</i>	Primary producer	* <i>Cryptochironomus sp.</i>	Herbivore
	<i>Gomphonema olivaceum</i>	Primary producer	<i>Asellus aquaticus</i>	Detritivore
	<i>Amphora pediculus</i>	Primary producer	* <i>Eiseniella tetraedra</i>	Detritivore
	<i>Staurosirella leptostauron</i>	Primary producer	* <i>Cymbella lanceolata</i>	Primary producer
	<i>Encyonema minutum</i>	Primary producer	<i>Encyonema minutum</i>	Primary producer
	<i>Melosira varians</i>	Primary producer	<i>Heterotrissocladius sp.</i>	Detritivore
	<i>Navicula menisculus</i>	Primary producer	<i>Tinodes waeneri</i>	Herbivore
	<i>Navicula gregaria</i>	Primary producer	Naididae	Detritivore
	<i>Nitzschia dissipata</i>	Primary producer	* <i>Brachycentrus subnubilus</i>	Herbivore
	<i>Nitzschia perminuta</i>	Primary producer	<i>Radix balthica</i>	Herbivore
	<i>Rhoicosphenia abbreviata</i>	Primary producer	<i>Gammarus pulex</i>	Detritivore
	Algal cysts	Primary producer	<i>Macropelopia sp.</i>	Predator
	<i>Navicula tripunctata</i>	Primary producer	<i>Potamopyrgus antipodarum</i>	Herbivore
	<i>Amphora ovalis</i>	Primary producer	<i>Limnius volckmari</i>	Detritivore
	<i>Gyrosigma sp.</i>	Primary producer	<i>Sialis lutaria</i>	Predator
	Naididae	Detritivore	<i>Melosira varians</i>	Primary producer
	Tubificidae	Detritivore	<i>Amphora pediculus</i>	Primary producer
	<i>Pisidium sp.</i>	Detritivore	Fungal spores	Decomposer
	<i>Limnius volckmari</i>	Detritivore	<i>Cymatopleura solea</i>	Primary producer
	<i>Asellus aquaticus</i>	Detritivore	<i>Navicula tripunctata</i>	Primary producer
	<i>Gammarus pulex</i>	Detritivore	<i>Cocconeis placentula</i>	Primary producer
	<i>Tinodes waeneri</i>	Herbivore	<i>Navicula lanceolata</i>	Primary producer

	<i>Cricotopus sp.</i>	Herbivore	<i>Navicula gregaria</i>	Primary producer
	<i>Microtendipes sp.</i>	Herbivore	<i>Gomphonema olivaceum</i>	Primary producer
	<i>Baetis sp.</i>	Herbivore	<i>Nitzschia perminuta</i>	Primary producer
	<i>Potamopyrgus antipodarum</i>	Herbivore	<i>Chroococcus minor</i>	Primary producer
	<i>Radix balthica</i>	Herbivore	Plant fragments	Detritus
	<i>Macropelopia sp.</i>	Predator	Algal cysts	Primary producer
	<i>Surirella minuta</i>	Primary producer	<i>Psammothidium lauenburgianum</i>	Primary producer
	<i>Ostracoda</i>	Detritivore	* <i>Surirella brebissonii</i>	Primary producer
	<i>Elmis aenea</i>	Detritivore	<i>Planothidium lanceolatum</i>	Primary producer
	<i>Oulimnius tuberculatus</i>	Detritivore	<i>Diatoma vulgare</i>	Primary producer
	Simuliidae	Detritivore	<i>Navicula menisculus</i>	Primary producer
	<i>Ephemera danica</i>	Detritivore	<i>Gongrosira incrustans</i>	Primary producer
	<i>Tipula montium</i>	Detritivore	<i>Nitzschia dissipata</i>	Primary producer
	<i>Synorthocladus sp.</i>	Herbivore	<i>Fragilaria vaucheriae</i>	Primary producer
	<i>Athripsodes sp.</i>	Herbivore	<i>Hyphomycete fungal hyphae</i>	Decomposer
	<i>Ancylus fluviatilis</i>	Herbivore	<i>Rhoicosphenia abbreviata</i>	Primary producer
	<i>Valvata piscinalis</i>	Herbivore	<i>Amorphus detritus</i>	Detritus
	<i>Pentaneura sp.</i>	Predator	<i>Spirulina sp.</i>	Primary producer
	<i>Polycentropus flavomaculatus</i>	Predator	<i>Staurosirella leptostauron</i>	Primary producer
	<i>Haliphus lineatocollis</i>	Predator	<i>Gyrosigma sp.</i>	Primary producer
	<i>Hydropsyche sp.</i>	Predator	<i>Staurosira elliptica</i>	Primary producer
	<i>Platambus maculatus</i>	Predator	<i>Amphora ovalis</i>	Primary producer
Non-aligned	<i>Hyphomycete fungal hyphae</i>	Decomposer		
	<i>Planothidium lanceolatum</i>	Primary producer		
	<i>Gongrosira incrustans</i>	Primary producer		
	<i>Cocconeis placentula</i>	Primary producer		
	<i>Fragilaria vaucheriae</i>	Primary producer		
	<i>Diatoma vulgare</i>	Primary producer		
	<i>Navicula lanceolata</i>	Primary producer		
	<i>Cymatopleura solea</i>	Primary producer		
	<i>Spirulina sp.</i>	Primary producer		
	<i>Heterotrissocladius sp.</i>	Detritivore		

Sialis lutaria

Predator

Erpobdella octoculata

Predator

Supplementary Table 6. Species alignment in control and drought pair of webs 4. Species in the control web are grouped into aligned and non-aligned groups. Within a group, survived species (non-shaded) are listed first in ascending order of body mass, followed by extinct species (*shaded*) in the same order. Species in the drought web are listed against their counterpart species in the control web based on the network alignment results. An asterisk (*) denotes an invaded species.

Web pair 4	Species in control web	Trophic group	Aligned species in drought web	Trophic group
Aligned	Amorphus detritus	Detritus	* <i>Tipula montium</i>	Detritivore
	Plant fragments	Detritus	<i>Microtendipes sp.</i>	Herbivore
	Fungal spores	Decomposer	<i>Baetis sp.</i>	Herbivore
	<i>Hyphomycete fungal hyphae</i>	Decomposer	<i>Heterotrissocladius sp.</i>	Detritivore
	<i>Chroococcus minor</i>	Primary producer	<i>Tubificidae</i>	Detritivore
	<i>Staurosira elliptica</i>	Primary producer	<i>Prodiamesa olivacea</i>	Detritivore
	<i>Psammothidium lauenburgianum</i>	Primary producer	<i>Spirulina sp.</i>	Primary producer
	<i>Gomphonema olivaceum</i>	Primary producer	* <i>Tinodes waeneri</i>	Herbivore
	<i>Amphora pediculus</i>	Primary producer	<i>Radix balthica</i>	Herbivore
	<i>Planothidium lanceolatum</i>	Primary producer	<i>Oulimnius tuberculatus</i>	Detritivore
	<i>Encyonema minutum</i>	Primary producer	<i>Macropelopia sp.</i>	Predator
	<i>Melosira varians</i>	Primary producer	<i>Gammarus pulex</i>	Detritivore
	<i>Cocconeis placentula</i>	Primary producer	<i>Cricotopus sp.</i>	Herbivore
	<i>Navicula menisculus</i>	Primary producer	<i>Potamopyrgus antipodarum</i>	Herbivore
	<i>Surirella minuta</i>	Primary producer	<i>Pisidium sp.</i>	Detritivore
	<i>Surirella brebissonii</i>	Primary producer	<i>Limnius volckmari</i>	Detritivore
	<i>Nitzschia perminuta</i>	Primary producer	<i>Hydropsyche sp.</i>	Predator
	<i>Fragilaria vaucheriae</i>	Primary producer	<i>Procladius sp.</i>	Herbivore
	<i>Rhoicosphenia abbreviata</i>	Primary producer	<i>Asellus aquaticus</i>	Detritivore
	Algal cysts	Primary producer	<i>Cryptochironomus sp.</i>	Herbivore
	<i>Navicula tripunctata</i>	Primary producer	Naididae	Detritivore
	<i>Amphora ovalis</i>	Primary producer	<i>Synorthocladius sp.</i>	Herbivore
	<i>Synedra ulna</i>	Primary producer	<i>Synedra ulna</i>	Primary producer
	<i>Gyrosigma sp.</i>	Primary producer	<i>Surirella brebissonii</i>	Primary producer
	<i>Oulimnius tuberculatus</i>	Detritivore	<i>Encyonema minutum</i>	Primary producer
	Naididae	Detritivore	<i>Cocconeis placentula</i>	Primary producer
	<i>Heterotrissocladius sp.</i>	Detritivore	<i>Hyphomycete fungal hyphae</i>	Decomposer

	<i>Tubificidae</i>	Detritivore	Plant fragments	Detritus
	<i>Limnius volckmari</i>	Detritivore	<i>Gyrosigma</i> sp.	Primary producer
	<i>Prodiamesa olivacea</i>	Detritivore	<i>Rhoicosphenia abbreviata</i>	Primary producer
	<i>Asellus aquaticus</i>	Detritivore	<i>Staurosira elliptica</i>	Primary producer
	<i>Pisidium</i> sp.	Detritivore	<i>Navicula lanceolata</i>	Primary producer
	<i>Procladius</i> sp.	Herbivore	<i>Diatoma vulgare</i>	Primary producer
	<i>Synorthocladius</i> sp.	Herbivore	<i>Fragilaria vaucheriae</i>	Primary producer
	<i>Cryptochironomus</i> sp.	Herbivore	<i>Gongrosira incrustans</i>	Primary producer
	<i>Baetis</i> sp.	Herbivore	<i>Surirella minuta</i>	Primary producer
	<i>Microtendipes</i> sp.	Herbivore	Amorphus detritus	Detritus
	<i>Potamopyrgus antipodarum</i>	Herbivore	<i>Navicula tripunctata</i>	Primary producer
	<i>Radix balthica</i>	Herbivore	<i>Amphora pediculus</i>	Primary producer
	<i>Macropelopia</i> sp.	Predator	<i>Nitzschia perminuta</i>	Primary producer
	<i>Hydropsyche</i> sp.	Predator	<i>Navicula gregaria</i>	Primary producer
	<i>Cymbella lanceolata</i>	Primary producer	Algal cysts	Primary producer
	<i>Polypedilum</i> sp.	Detritivore	Fungal spores	Decomposer
	<i>Elmis aenea</i>	Detritivore	<i>Amphora ovalis</i>	Primary producer
	<i>Sericostoma personatum</i>	Detritivore	<i>Gomphonema olivaceum</i>	Primary producer
	<i>Ephemera danica</i>	Detritivore	<i>Navicula menisculus</i>	Primary producer
	<i>Athripsodes</i> sp.	Herbivore	<i>Planothidium lanceolatum</i>	Primary producer
	<i>Ancylus fluviatilis</i>	Herbivore	<i>Melosira varians</i>	Primary producer
	<i>Valvata piscinalis</i>	Herbivore	<i>Nitzschia dissipata</i>	Primary producer
	<i>Theodoxus fluviatilis</i>	Herbivore	<i>Chroococcus minor</i>	Primary producer
	<i>Pentaneura</i> sp.	Predator	<i>Cymatopleura solea</i>	Primary producer
	<i>Haliphus lineatocollis</i>	Predator	<i>Psammothidium lauenburgianum</i>	Primary producer
Non-aligned	<i>Gongrosira incrustans</i>	Primary producer		
	<i>Navicula gregaria</i>	Primary producer		
	<i>Nitzschia dissipata</i>	Primary producer		
	<i>Diatoma vulgare</i>	Primary producer		
	<i>Navicula lanceolata</i>	Primary producer		
	<i>Cymatopleura solea</i>	Primary producer		
	<i>Spirulina</i> sp.	Primary producer		

<i>Gammarus pulex</i>	Detritivore
<i>Cricotopus sp.</i>	Herbivore
<i>Ostracoda</i>	Detritivore
<i>Polycentropus flavomaculatus</i>	Predator
<i>Sialis lutaria</i>	Predator
<i>Erpobdella octoculata</i>	Predator

Supplementary Table 7. Trophic plasticity restored densely connected regions in food webs. For each pair of webs, the connectance of the control, aligned subgraph in control and drought are shown, together with mean values and standard deviations (S.D.) across all webs.

Food web pair	Control	Aligned control subgraph	Drought
1	0.0862	0.1123	0.1254
2	0.0756	0.0893	0.0879
3	0.0806	0.1125	0.0991
4	0.0710	0.0991	0.0973
Mean	0.0783	0.1033	0.1024
S.D.	0.0065	0.0112	0.0161

Supplementary Table 8. The number of consumers and resources in each web.

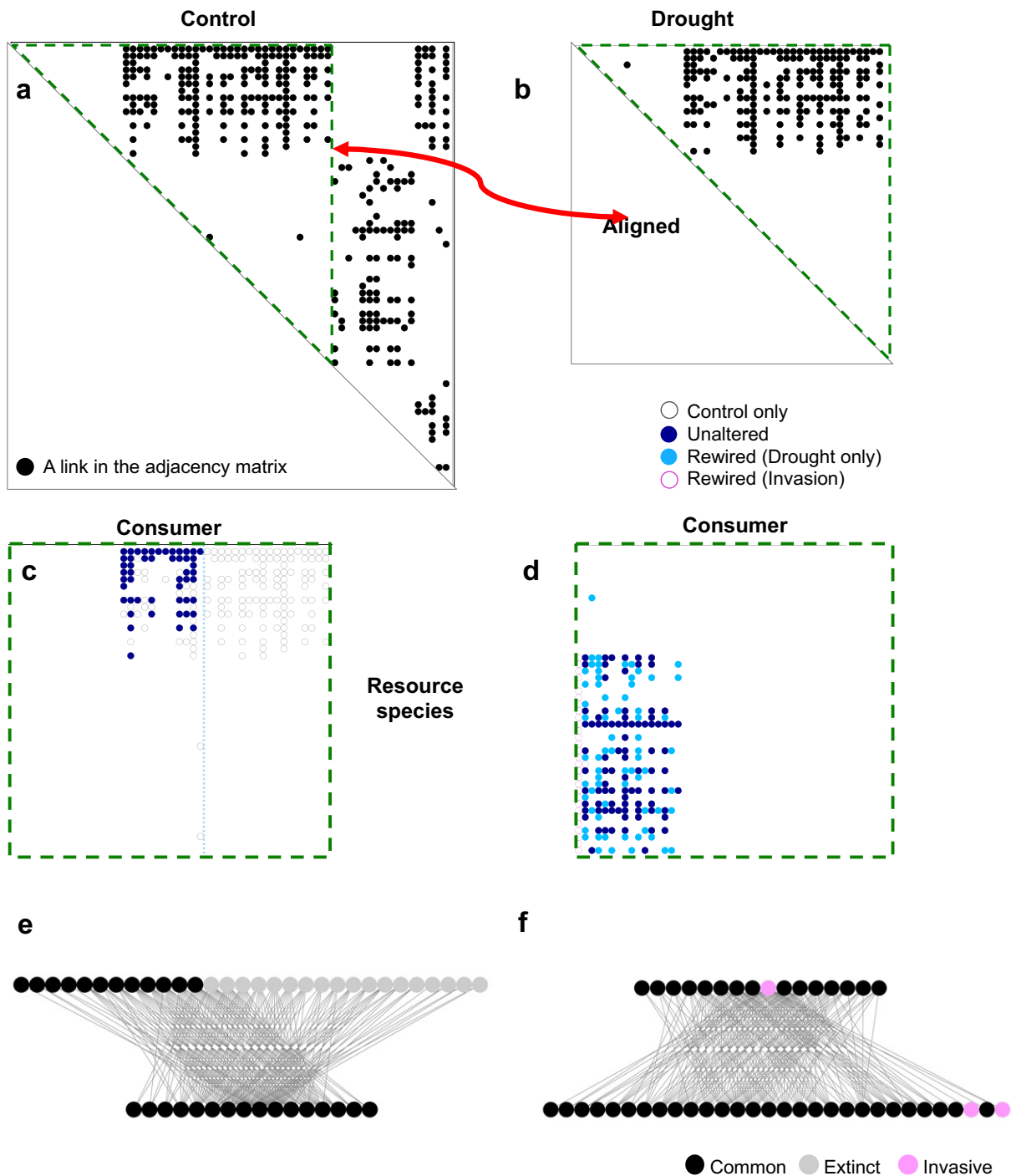
Food web pair	Control		Drought	
	Consumers	Resources	Consumers	Resources
1	30	29	21	26
2	34	29	16	30
3	31	30	18	31
4	33	32	21	31
Mean	32	30	19	29.5
S.D.	1.8257	1.1442	2.4495	2.3805

Supplementary Table 9. Reduction in biomass fluxes following drought. For each pair of webs, the total biomass fluxes measured in $\text{g m}^{-2} \text{y}^{-1}$ from resources to consumers of the aligned subgraph in control and drought, and the percentages in reduction are shown, together with mean values across all webs.

Food web pair	Aligned control subgraph	Drought	% in reduction
1	153.43	60.07	60.85
2	121.39	33.66	72.27
3	40.17	32.24	19.74
4	55.95	32.70	41.55
Mean	92.74	39.67	48.60

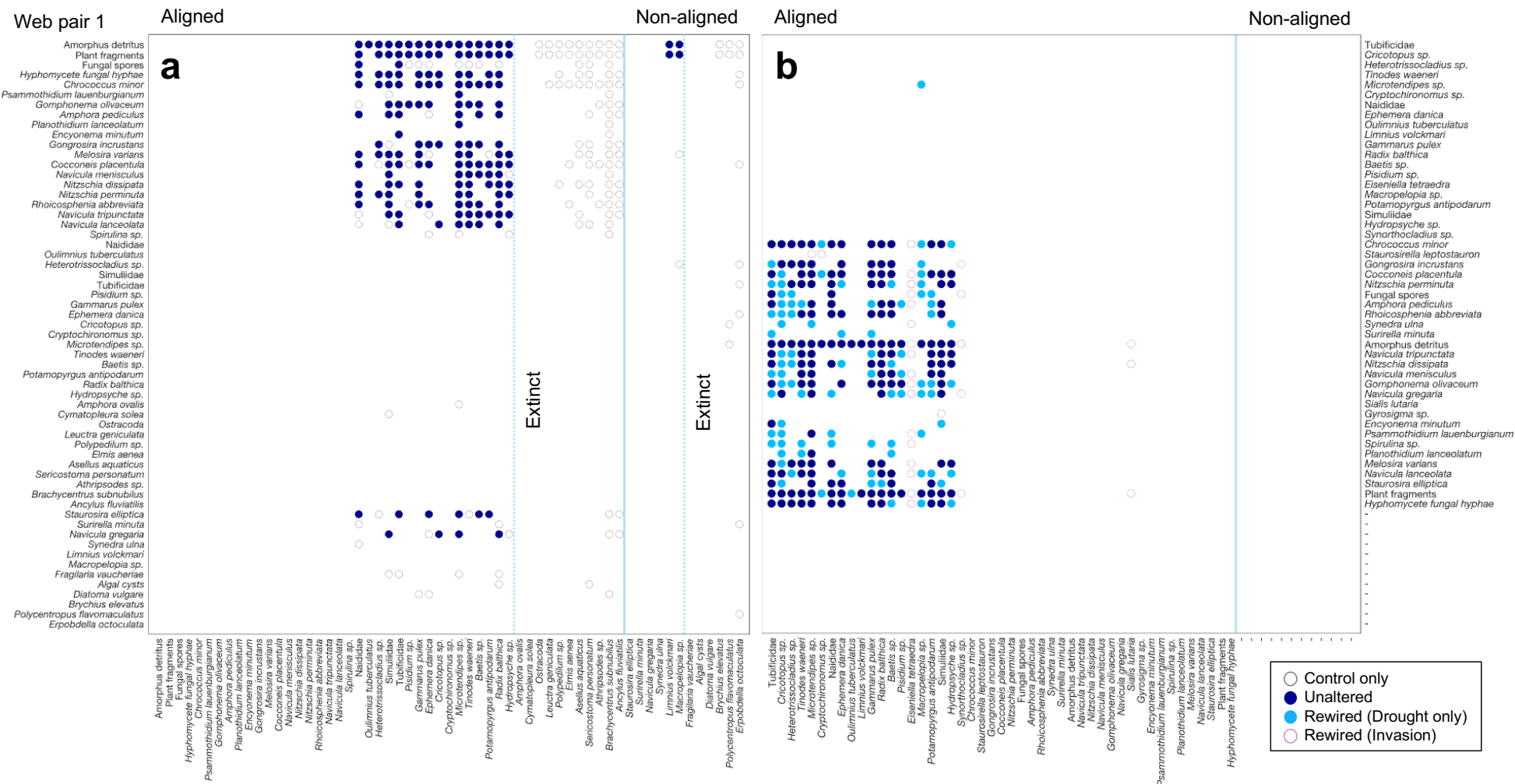
Supplementary Table 10. Species ID and their names.

1	<i>Algal cysts</i>	39	<i>Navicula gregaria</i>
2	<i>Amorphus detritus</i>	40	<i>Navicula lanceolata</i>
3	<i>Amphora ovalis</i>	41	<i>Navicula menisculus</i>
4	<i>Amphora pediculus</i>	42	<i>Navicula tripunctata</i>
5	<i>Ancylus fluviatilis</i>	43	<i>Nitzschia dissipata</i>
6	<i>Asellus aquaticus</i>	44	<i>Nitzschia perminuta</i>
7	<i>Athripsodes sp.</i>	45	<i>Ostracoda</i>
8	<i>Baetis sp.</i>	46	<i>Oulimnius tuberculatus</i>
9	<i>Brachycentrus subnubilus</i>	47	<i>Pentaneura sp.</i>
10	<i>Brychius elevatus</i>	48	<i>Pisidium sp.</i>
11	<i>Chrococcus minor</i>	49	<i>Planothidium lanceolatum</i>
12	<i>Cocconeis placentula</i>	50	Plant fragments
13	<i>Cricotopus sp.</i>	51	<i>Platambus maculatus</i>
14	<i>Cryptochironomus sp.</i>	52	<i>Polycentropus flavomaculatus</i>
15	<i>Cymatopleura solea</i>	53	<i>Polypedium sp.</i>
16	<i>Cymbella lanceolata</i>	54	<i>Potamopyrgus antipodarum</i>
17	<i>Diatoma vulgare</i>	55	<i>Procladius sp.</i>
19	<i>Elmis aenea</i>	56	<i>Prodiamesa olivacea</i>
20	<i>Encyonema minutum</i>	57	<i>Psammothidium lauenburgianum</i>
21	<i>Ephemera danica</i>	58	<i>Radix balthica</i>
22	<i>Erpobdella octoculata</i>	59	<i>Rhoicosphenia abbreviata</i>
23	<i>Fragilaria vaucheriae</i>	60	<i>Sericostoma personatum</i>
24	Fungal spores	61	<i>Sialis lutaria</i>
25	<i>Gammarus pulex</i>	62	Simuliidae
26	<i>Gomphonema olivaceum</i>	63	<i>Spirulina sp.</i>
27	<i>Gongrosira incrustans</i>	64	<i>Staurosira elliptica</i>
28	<i>Gyrosigma sp.</i>	65	<i>Staurosirella leptostauron</i>
29	<i>Haliplus lineatocollis</i>	66	<i>Surirella brebissonii</i>
30	<i>Heterotrissocladius sp.</i>	67	<i>Surirella minuta</i>
31	<i>Hydropsyche sp.</i>	68	<i>Synedra ulna</i>
32	<i>Hyphomycete fungal hyphae</i>	69	<i>Synorthocladius sp.</i>
33	<i>Leuctra geniculata</i>	70	<i>Theodoxus fluviatilis</i>
34	<i>Limnius volckmari</i>	71	<i>Tinodes waeneri</i>
35	<i>Macropelopia sp.</i>	72	<i>Tipula montium</i>
36	<i>Melosira varians</i>	73	Tubificidae
37	<i>Microtendipes sp.</i>	74	<i>Valvata piscinalis</i>
38	Naididae		

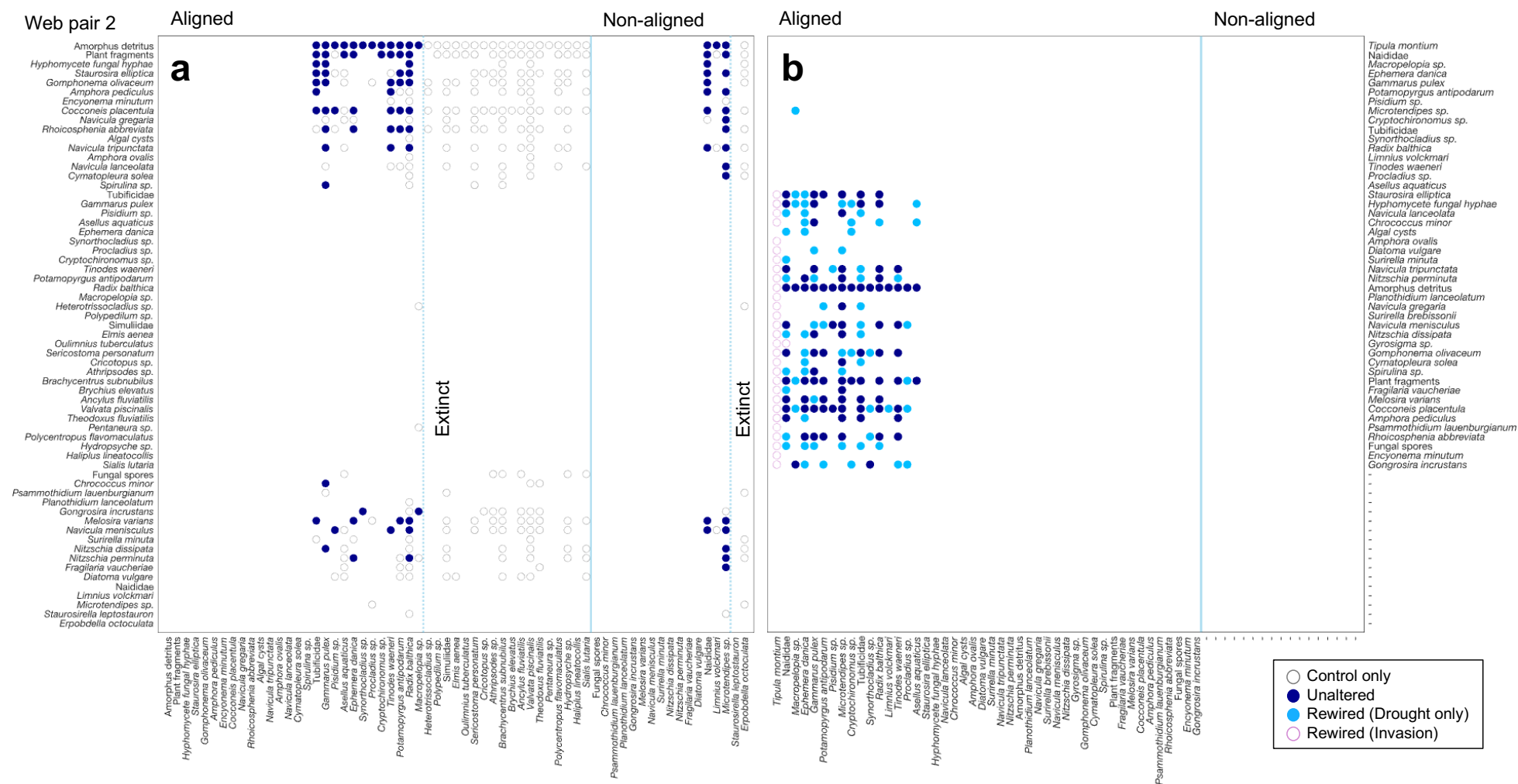


Supplementary Figure 1. Network alignment between a control and drought pair of webs. **a** Undirected adjacency matrix of a control web with undirected links (black circles) whereby species are sorted into aligned and non-aligned (see Methods). Only the top half of the matrix is shown here. **b**, Undirected adjacency matrices of the correspond drought web. Biodiversity loss following drought means that the drought web has fewer nodes. Here, nodes have been aligned with a corresponding node in the control web (boxed by green dashed line) that maximised the similarity in the topology, revealing structural inertia following drought. **c** The aligned region of the binary matrix of a control web whereby species are placed in the same order as (**a**). A link can either be unaltered by drought (dark blue circles) or in control only (unfilled grey circles), with the latter mostly associated with extinct consumers on the right-hand side of the matrix (marked by dotted vertical line). **d** The aligned

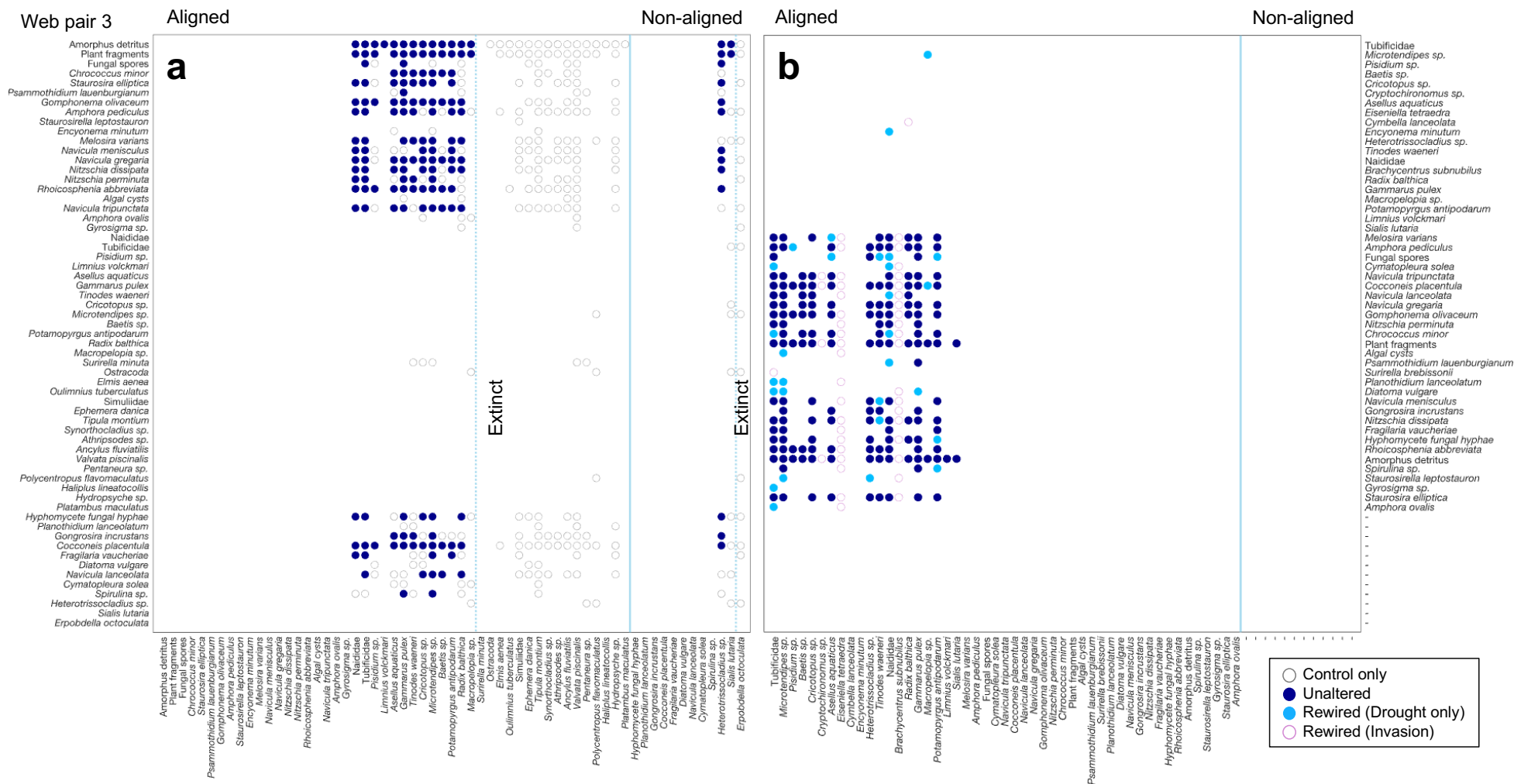
region of the binary matrix of the corresponding drought web whereby species are placed in the same order as **(b)**. In addition to unaltered links, rewired links as a result of dietary change (light blue circles) and species invasion (unfilled pink circles) are shown. Here, it can be seen that while the network patterns from the control-drought pair of webs are similar following alignment, the actual interactions and dynamics that made up these patterns are very different. The former is governed by a much wider range of consumer species who fed on a few resource species, while the latter shows a few consumer species feeding on a large number of resources as a result of trophic plasticity. Only one pair of webs is shown here, all webs are shown in (Supplementary Fig. 2-5). **e,f** Simplified trophic diagrams of a control-drought pair of webs (**c,d**) respectively. Consumers and resources are in the top and bottom rows respectively. Species include those who survived (dark circles) or went extinct (grey circles), and invasive species (pink circles). Both consumers and resources are arranged in descending order of degree from the centre. In the aligned region of the control web (**e**), the topological pattern is formed by a large number of consumers over a relatively small range of resources. In the drought web, the pattern is made up by a small number of consumers and a wider range of resources. Only one pair of webs is shown here, all webs are shown in (Supplementary Fig. 6).



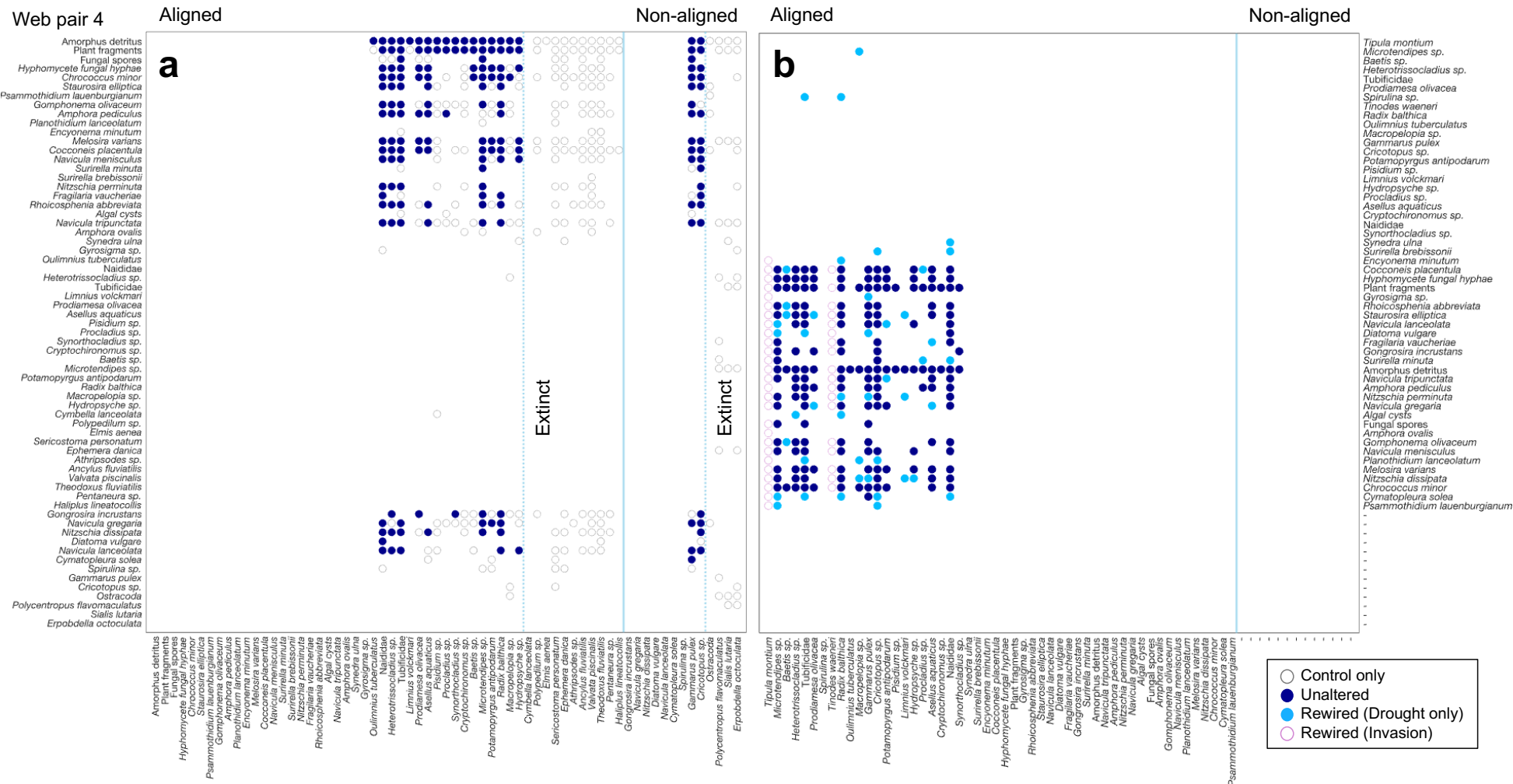
Supplementary Figure 2. Network Alignment between control and drought pair of webs 1. **a** Sorted binary matrix of the control web. Aligned species are sorted by their trophic groups (resource species followed by consumers, see Methods) and then by ascending order of body mass. Survived species and extinct species are separated by the blue dotted line. Non-aligned species are ordered in the same way. Among the survived species, we observed interactions that are common to both webs (dark filled circles) and those that no longer exist in the drought web (non-filled circles, dark border). **b** Binary matrix of the drought web whereby species have been placed in the same network locations of their aligned species in the control web. New interactions arise through survived species establishing new feeding links (light filled circles), or as a result of invaded species (non-filled circles, light border). Details on the species are listed in Supplementary Table 3.



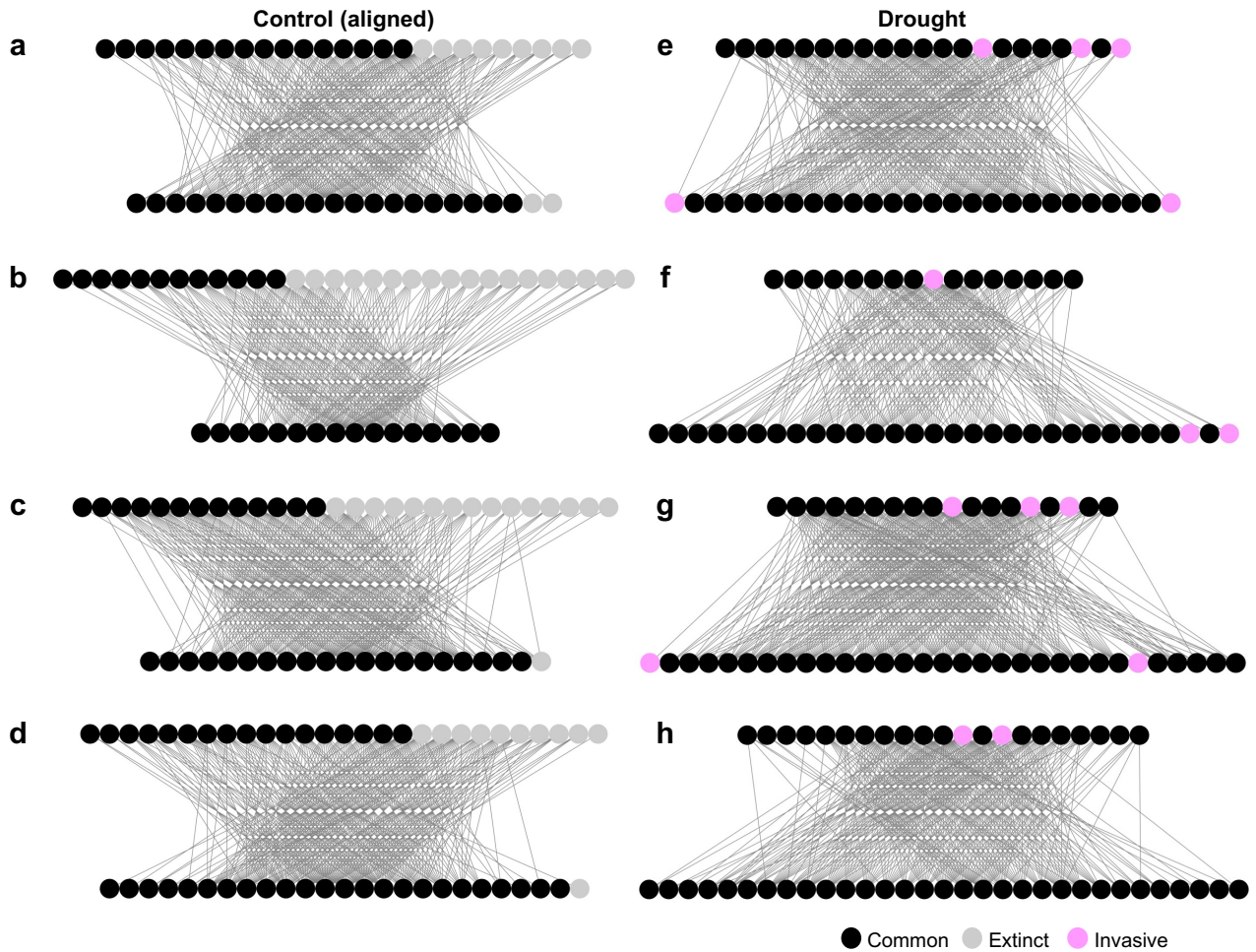
Supplementary Figure 3. Network Alignment between control and drought pair of webs 2. **a** Sorted binary matrix of the control web. Aligned species are sorted by their trophic groups (resource species followed by consumers, see Methods) and then by ascending order of body mass. Survived species and extinct species are separated by the blue dotted line. Non-aligned species are ordered in the same way. Among the survived species, we observed interactions that are common to both webs (dark filled circles) and those that no longer exist in the drought web (non-filled circles, dark border). **b** Binary matrix of the drought web whereby species have been placed in the same network locations of their aligned species in the control web. New interactions arise through survived species establishing new feeding links (light filled circles), or as a result of invaded species (non-filled circles, light border). Details on the species are listed in Supplementary Table 4.



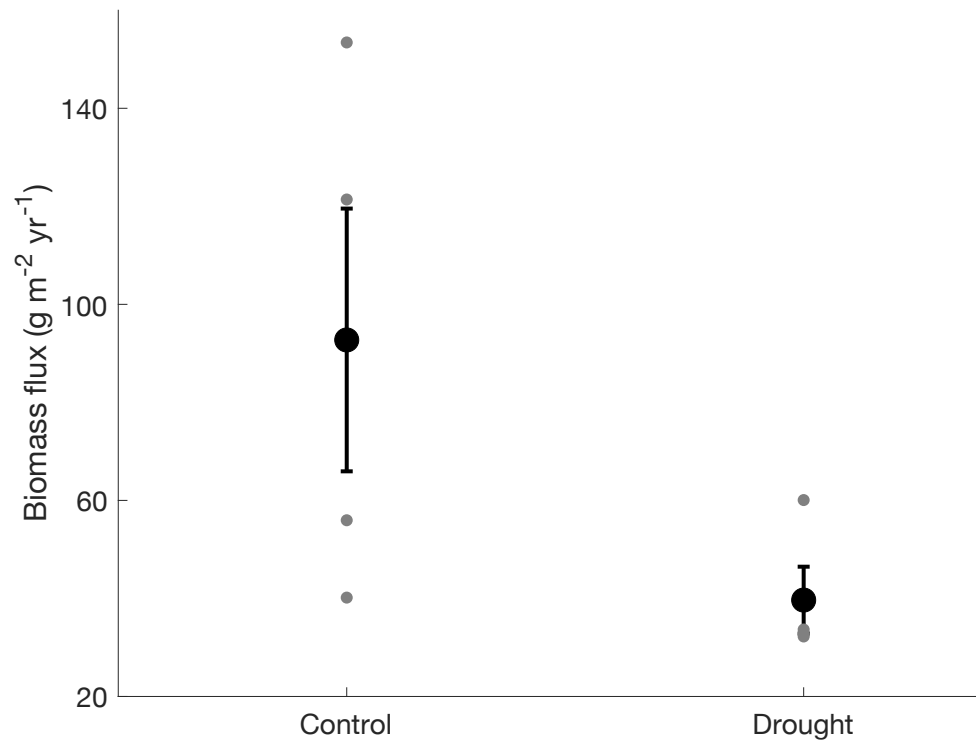
Supplementary Figure 4. Network Alignment between control and drought pair of webs 3. a Sorted binary matrix of the control web. Aligned species are sorted by their trophic groups (resource species followed by consumers, see Methods) and then by ascending order of body mass. Survived species and extinct species are separated by the blue dotted line. Non-aligned species are ordered in the same way. Among the survived species, we observed interactions that are common to both webs (dark filled circles) and those that no longer exist in the drought web (non-filled circles, dark border). **b** Binary matrix of the drought web whereby species have been placed in the same network locations of their aligned species in the control web. New interactions arise through survived species establishing new feeding links (light filled circles), or as a result of invaded species (non-filled circles, light border). Details on the species are listed in Supplementary Table 5.



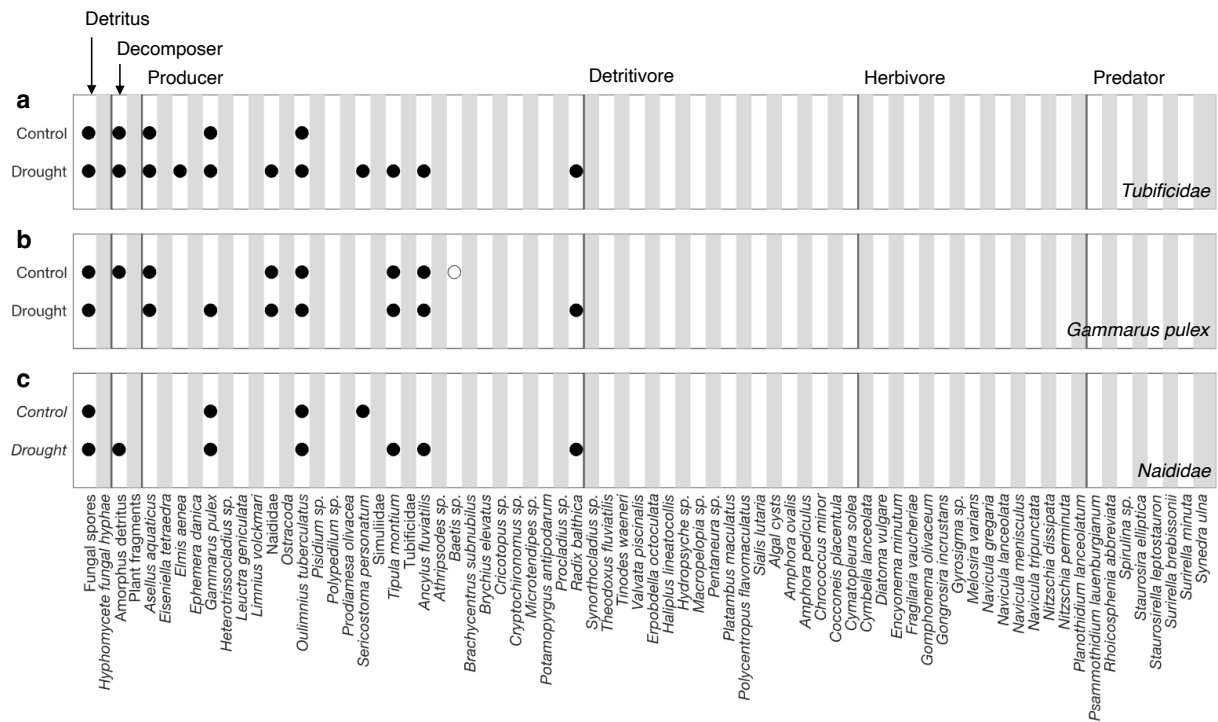
Supplementary Figure 5. Network Alignment between control and drought pair of webs 4. **a** Sorted binary matrix of the control web. Aligned species are sorted by their trophic groups (resource species followed by consumers, see Methods) and then by ascending order of body mass. Survived species and extinct species are separated by the blue dotted line. Non-aligned species are ordered in the same way. Among the survived species, we observed interactions that are common to both webs (dark filled circles) and those that no longer exist in the drought web (non-filled circles, dark border). **b** Binary matrix of the drought web whereby species have been placed in the same network locations of their aligned species in the control web. New interactions arise through survived species establishing new feeding links (light filled circles), or as a result of invaded species (non-filled circles, light border). Details on the species are listed in Supplementary Table 6.



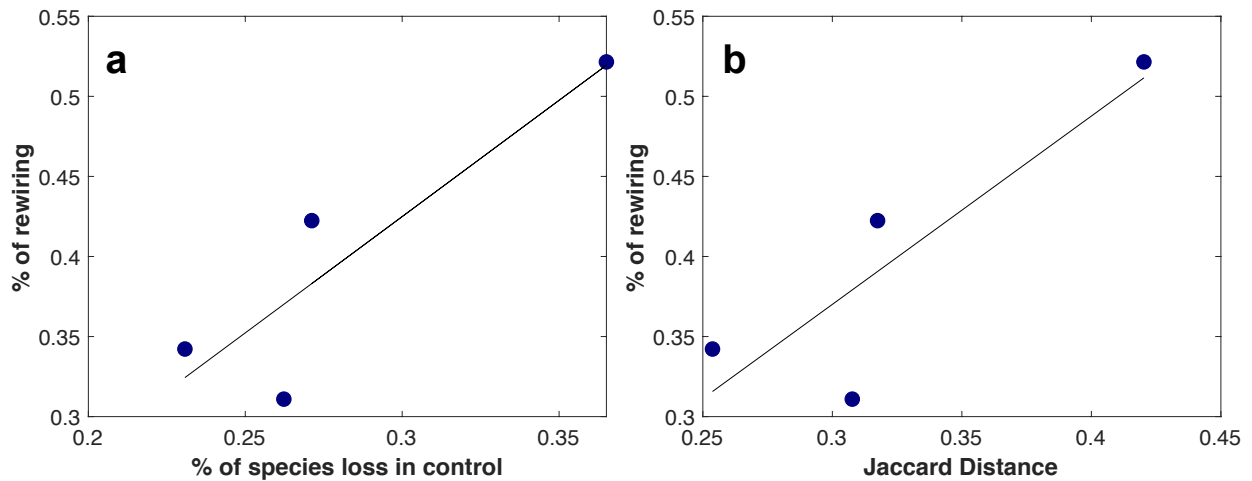
Supplementary Figure 6. Topological patterns in drought webs are manifested by fewer consumers with wider diet breaths. a-h simplified trophic diagrams of the control (a-d) and drought (e-h) pairs of webs, with species who survived drought (dark circles) or went extinct (grey circles), and invasive species (pink circles). Both consumers and resources are arranged in descending order of degree from the centre. The patterns of the aligned control webs (a-d) show a wide range of consumers feeding on a smaller range of resource species; whilst the patterns of the drought webs (e-h) are formed by a much smaller range of consumers feeding over a wider range of resource species.



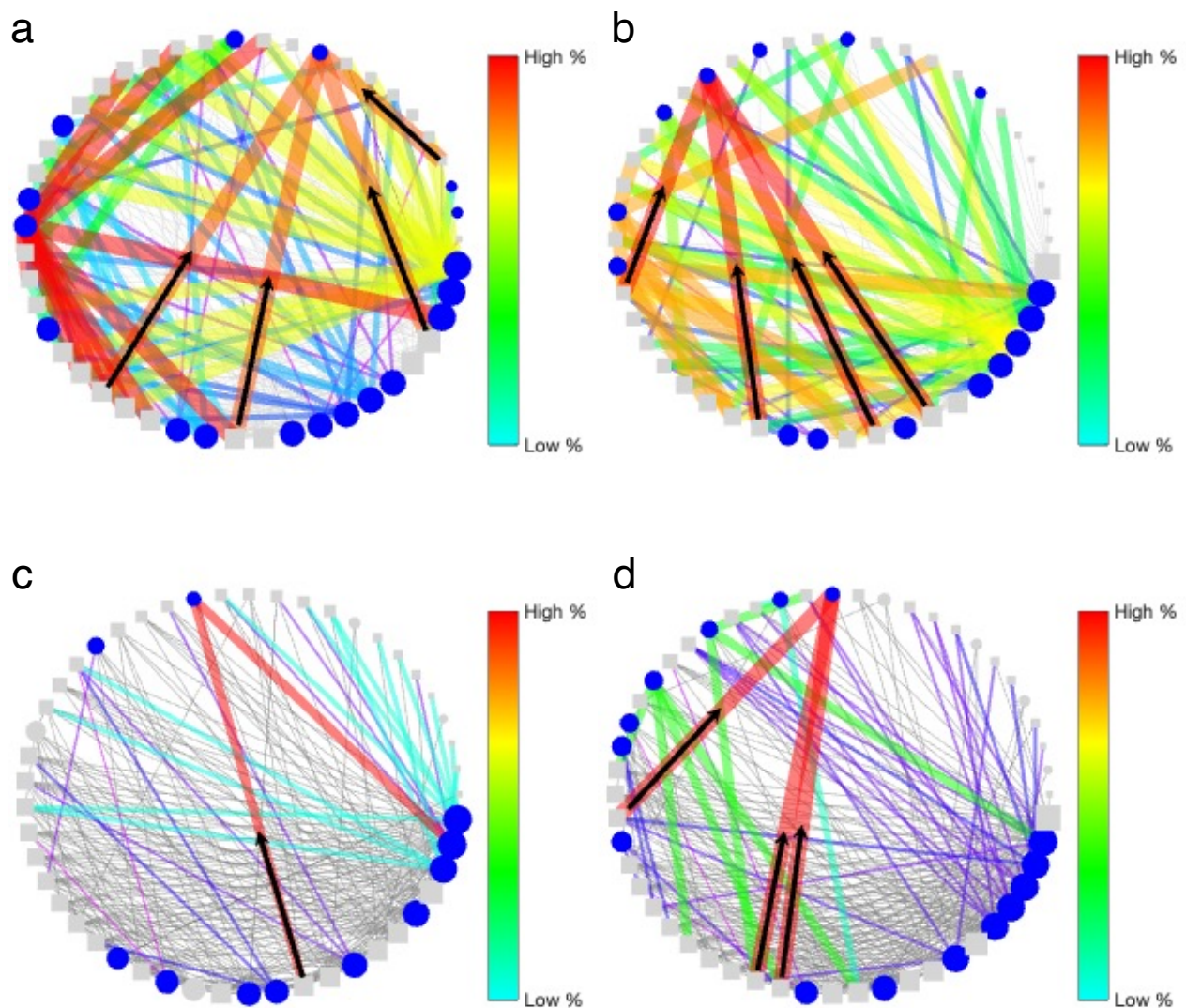
Supplementary Figure 7. Reduction in the total biomass fluxes following drought. The total biomass fluxes measured in $\text{g m}^{-2} \text{yr}^{-1}$ from resources to consumers in drought webs and in their aligned control counterparts, with an average of 49% reduction of biomass fluxes in the former (*two-tailed paired t-test*, *d.f.* = 3, *p* = 0.09; Supplementary Table 9). Error bars indicate standard error of the mean.



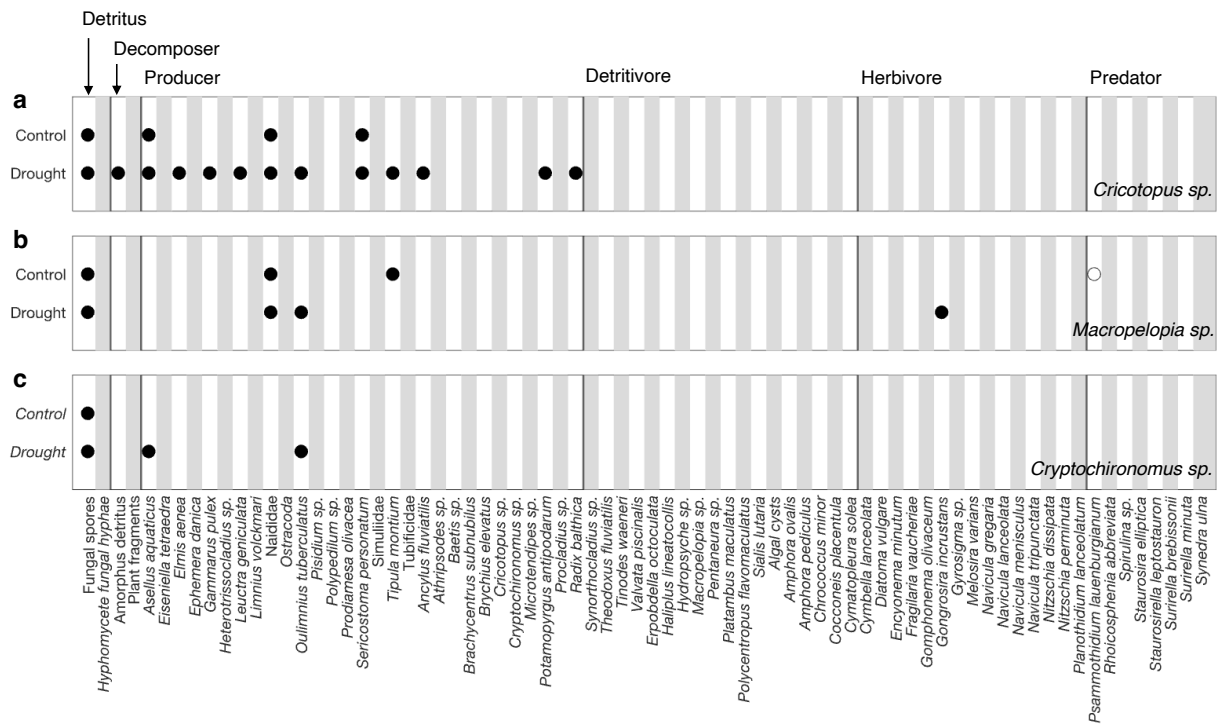
Supplementary Figure 8. Dietary shifts among the highly interconnected generalists. a-c *Tubificidae*, *Gammarus pulex* and *Naididae* respectively. Species on the x-axis are categorised into functional groups and then ordered by increasing order of body mass. Resources (filled circles) of a given generalists are shown in a pair of control and drought webs, with those who are extinct following drought indicated (not filled circles).



Supplementary Figure 9. The level of rewiring increases with biodiversity loss. **a** The proportion of rewiring found in a drought web directly increases with the amount of species loss in the corresponding control web (Linear regression: $F_{1,3} = 7.87$, $P = 0.107$, $r^2 = 0.80$; $y = -0.0108 + 1.4524x$). **b** The greater the difference in the species composition between the control and drought web pairs, the higher the level of rewiring found in the drought web (Linear regression: $F_{1,3} = 6.21$, $P = 0.130$, $r^2 = 0.76$; $y = 0.0173 + 1.1759x$). Both cases show that the level of rewiring, which is the proportion of new links found in the drought web that were not in the control counterpart, increases with the extent in which food webs were perturbed, albeit not significantly due to small sample size.



Supplementary Figure 10. Adaptability among poorly connected species governs persistence in the face of drought. a-d Drought webs 1-4, respectively. Specialist species with narrower diets were found to have rewired proportionally more than generalist species. Circles are consumers whereby those in blue have rewired, otherwise, they are in grey. Squares are resource species. All nodes are placed in ascending order of degree, indicated by node size. Links are divided into unaltered links from the control web (unweighted grey lines) and rewired links that are only found in the drought web (weighted and colour-mapped lines), with both colour and weight indicating the proportion of rewired links of a given species. An example of a low degree consumer with a high proportion of rewired links is shown in each case with the transfer of energy fluxes from new resource species indicated by dark arrows.



Supplementary Figure 11. Dietary shifts among the highly rewired specialists. a-c *Cricotopus sp.*, *Macropelopia sp.* and *Cryptochironomus sp.* respectively. Species on the x-axis are categorised into functional groups and then ordered by increasing order of body mass. Resources (filled circles) of a given generalists are shown in a pair of control and drought webs, with those who are extinct following drought indicated (not filled circles).