Supplementary Materials

Table S1. Characteristics of the sources used to determine flora accompanying *Bidens frondosa* in the study area. Regions are numbered according to the state system of region numeration.

Administrative Region	Number of the region	Sources	Year(s) of the *B. frondosa* studies	Number of floristic lists used per region
Belgorod Region	31	No data	–	–
Bryansk Region	32	Panasenko et al. (2015), Arepieva & Panasenko (2020), Bulokhov et al. (2021)	1984, 1985, 1990, 2013–2019	82
Chelyabinsk Region	74	No data	–	–
Chuvash Republic	21	Gafurova (2017)	2001	1
Ivanovo Region	37	Borisova et al. (2013), Borisova & Shilov (2016), Borisova et al. (2019), Dmitrieva (2021)	2013, 2016, 2019, 2021	3
Kaluga Region	40	Semenishchenkov (2014)	2013	2
Kirov Region	43	No data	–	–
Kurgan Region	45	Data of the authors	2021	6
Kursk Region	46	Poluyanov (2008)	2005, 2007, 2008, 2013	9
Leningrad Region	47	Glazkova (2005)	2004	1
Lipetsk Region	48	Oral communication of Elena A. Starodubtseva	2011, 2016, 2018	5
Moscow Region	50	No data	–	–
Nizhnii Novgorod Region	52	No data	–	–
Novgorod Region	53	No data	–	–
Orel Region	57	No data	–	–
Orenburg Region	56	Lapov (2011)	2009	1
Penza Region	58	Vasjukov et al. (2014, 2019); oral communication of Vladimir M. Vasjukov	2013, 2017, 2021	6
Permsky Krai	59	No data	–	–
Pskov Region	60	No data	–	–
Republic of Bashkiria	02	Abramova (2011), Golovanov & Abramova (2012)	2000, 2009	9
Republic of Mari El	12	No data	–	–
Republic of Mordovia	13	Data of the authors	2013, 2014, 2021	16
Republic of Tatarstan	16	Prokhorov et al. (2017)	2011, 2015, 2017	4
Republic of Udmurtia	18	No data	–	–
Ryazan Region	62	No data	–	–
Samara Region	63	Solov'eva & Saksonov (2007), Lapov (2011), Solovyova (2017, 2020)	2005, 2006, 2009	10
Saratov Region	64	No data	–	–
Smolensk Region	67	No data	–	–
Sverdlovsk Region	66	Data of the authors	2015	6
Tambov Region	68	Oral communication of Elena V. Ershkova	2014	1
Tula Region	71	No data	–	–
Tver Region	69	No data	–	–
Tyumen Region	72	Data of the authors	2018–2021	9
Ulyanovsk Region	73	Vargot (2009), Vargot et al. (2015), Ruchin et al. (2016)	2007, 2014	5
Vladimir Region	33	Seregin (2008), Borisova (2015)	2007, 2014	2
Voronezh Region	36	Oral communication of Elena A. Starodubtseva	2007, 2009, 2010, 2012, 2013, 2016	8
Yaroslavl Region	76	Belyakov (2020), Krylova et al. (2021)	2018, 2019	5

Table S2. Designations of environmental factor scores based on Tsyganov (1983).

Score	Designation of scores in each environmental factor	Ecological group name
	TM – thermoclimatic scale	
1	arctic (0-10 kcal/cm×cm×year)	polar
2	arctic / sub-arctic	mesoarctic
3	sub-arctic (10-20 kcal/cm×cm×year)	sub-arctic
4	sub-arctic / boreal	arctoboreal
5	boreal (20-30 kcal/cm×cm×year)	euboreal
6	boreal / sub-boreal	mesoboreal
7	sub-boreal (30-40 kcal/cm×cm×year)	sub-boreal
8	sub-boreal / nemoral	boreal-nemoral
9	nemoral (40-50 kcal/cm×cm×year)	eunemoral
10	nemoral / sub-Mediterranean	thermonemoral
11	sub-Mediterranean (50-60 kcal/cm×cm×year)	sub-mediterranean
12	sub-Mediterranean / Mediterranean	mesomediterranean
13	Mediterranean (60-70 kcal/cm×cm×year)	eumediterranean
14	Mediterranean / tropical	subtropical
15	tropical (70-80 kcal/cm×cm×year)	tropical
16	tropical / equatorial	subequatorial
17	equatorial (80 kcal/cm×cm×year)	equatorial
	KN – climate continentality	
1	extraoceanic	extraoceanic
2	extraoceanic / oceanic	oceanic 1st
3	oceanic	oceanic 2nd
4	oceanic / marine	sub-oceanic
5	marine	marine
6	marine / sub-mainland	seaboard
7	sub-mainland	sub-mainland
8	sub-mainland / mainland	mainland 1st
9	mainland	mainland 2nd
10	mainland / sub-continental	semi-continental
11	sub-continental	sub-continental
12	sub-continental / continental	mesocontinental
13	continental	continental 1st
14	continental / ultra-continental	continental 2nd
15	ultra-continental	ultra-continental
	OM – climate aridity/humidity	
1	extra-arid (P-E= -1600 mm/year and lower): P-precipitation/year, E-evaporation/year	extra-arid
2	extraarid / arid	perarid
3	arid (P-E = -800 - 1600 mm/year): P-precipitation/year, E-evaporation/year	arid
4	arid / mesoarid	mesoarid 1st
5	mesoarid (P-E -400 - 800 mm/year): P-precipitation/year, E-evaporation/year	mesoarid 2nd
6	mesoarid / sub-arid	sub-arid 1st
7	sub-arid (P-E = 0-400 mm/year): P-precipitation/year, E-evaporation/year	sub-arid 2nd
8	sub-arid / sub-humid	semi-arid
9	sub-humid (P-E = 0-400 mm/year): P-precipitation/year, E-evaporation/year	sub-humid 1st
10	sub-humid / humid	sub-humid 2nd
11	humid (P-E = 400-800 mm/year): P-precipitation/year, E-evaporation/year	meso-humid
12	humid / perhumid	euhumid
13	perhumid (P-E = 800-1600 mm/year): P-precipitation/year, E-evaporation/year	perhumid 1st
14	perhumid / hyper-humid	perhumid 2nd
15	hyper-humid (P-E = 1600 mm/year and higher): P-precipitation/year, E-evaporation/year	hyper-humid
	CR – cryoclimatic scale	
1	very severe winters (mean temperature of the coldest month: < -32°C)	hypercryothermic 1st
2	very severe winters / severe winters	hypercryothermic 2nd
3	severe winters (mean temperature of the coldest month: between -24°C and -32°C)	percryothermic 1st
4	severe winters / quite severe winters	percryothermic 2nd
5	quite severe winters (mean temperature of the coldest month: between -16°C and -24°C)	cryothermic 1st
6	quite severe winters / moderate winters	cryothermic 2nd
7	moderate winders (mean temperature of the coldest month: between -8°C and -16°C)	sub-cryothermic 1st
8	moderate winters / mild winters	sub-cryothermic 2nd

9	mild winters (mean temperature of the coldest month: between 0°C and -8°C)	hemi-cryothermic 1st
10	mild winters / warm winters	hemi-cryothermic 2nd
11	warm winters (mean temperature of the coldest month: between 0°C and +8°C)	acryothermic
12	warm winters / very warm winters	sub-thermophilic 1st
13	very warm winters (mean temperature of the coldest month: between +8°C and +16°C)	sub-thermophilic 2nd
14	very warm winters / unexpressed winters	thermophilic 1st
15	unexpressed winters (mean temperature of the coldest month: > +16°C)	thermophilic 2nd
	HD – soil moisture	
1	desert	dry desert
2	desert / semi-desert	mid-desert
3	semi-desert	semi-desert
4	semi-desert / dry-steppe	desert-steppe
5	dry-steppe	sub-steppe
6	dry-steppe / middle-steppe	dry steppe
7	middle-steppe	mid-steppe
8	middle-steppe / meadow-steppe	fresh-steppe
9	meadow-steppe	humid-steppe
10	meadow-steppe / dry forest-meadow	sub-forest-meadow
11	dry forest-meadow	dry forest-meadow
12	dry forest-meadow / moist forest-meadow	fresh forest-meadow
13	moist forest-meadow	humid forest meadow
14	moist forest-meadow / wet forest-meadow	dampish forest-meadow
15	wet forest-meadow	damp forest-meadow
16	wet forest-meadow / palustrine forest-meadow	wet forest-meadow
17	palustrine forest-meadow	swamp forest-meadow
18	palustrine forest-meadow / palustrine	sub-mire
19	palustrine	mire
20	palustrine / semi-aquatic	aquatic-mire
21	semi-aquatic	semi-aquatic
22	semi-aquatic / aquatic	shallow-water
23	aquatic	aquatic
	TR – scale of the soil salt regime	
1	especially salt-poor soils	glycooligotrophic
2	especially salt-poor soils / salt-poor soils	glycosuboligotrophic
3	salt-poor soils	glycosemioligotrophic
4	salt-poor soils / non-rich in salt soils	glycosubmesotrophic
5	non-rich in salt soils	glycomesotrophic
6	non-rich in salt soils / quite salt-rich soils	glycopermesotrophic
7	quite salt-rich soils	glycosemieutrophic
8	quite salt-rich soils / salt-rich soils	glycosubeutrophic
9	salt-rich soils	glycoeutrophic
10	salt-rich soils / slightly saline soils	pertrophic
11	slightly saline soils	haloeutrophic
12	slightly saline soils / moderately saline soils	halosubeutrophic
13	moderately saline soils	halosemieutrophic
14	moderately saline soils / highly saline soils	halopermesotrophic
15	highly saline soils	halomesotrophic
16	highly saline soils / extremely saline soils	halosubmesotrophic
17	extremely saline soils	halosemioligotrophic
18	extremely saline soils / extremely salinate fields	halosuboligotrophic
19	extremely salinate fields	halooligotrophic
	NT – soil nitrogen availability	
1	nitrogen-free soils	anitrophilic
2	nitrogen-free soils / very nitrogen-poor soils	sub-anitrophilic 1st
3	very nitrogen-poor soils	sub-anitrophilic 2nd
4	very nitrogen-poor soils / nitrogen-poor soils	hemi-nitrophilic 1st
5	nitrogen-poor soils	hemi-nitrophilic 2nd
6	nitrogen-poor soils / sufficiently nitrogen-rich soils	sub-nitrophilic 1st
7	sufficiently nitrogen-rich soils	sub-nitrophilic 2nd
8	sufficiently nitrogen-rich soils / nitrogen-rich soils	nitrophilic 1st
9	nitrogen-rich soils	nitrophilic 2nd
10	nitrogen-rich soils / redundantly nitrogen-rich soils	nitrophilic 3rd
11	redundantly nitrogen-rich soils	nitrophilic 4th

	RC – soil pH	
1	extremely acidic soils (pH < 3.5)	hyperacidophilic 1st
2	extremely acidic soils / very acidic soils	hyperacidophilic 2nd
3	highly acidic soils (pH=3.5-4.5)	peracidophilic 1st
4	highly acidic soils / acidic soils	peracidophilic 2nd
5	acidic soils (pH=4.5-5.5)	mesoacidophilic 1st
6	acidic soils / slightly acidic soils	mesoacidophilic 2nd
7	slightly acidic soils (pH=5.5-6.5)	subacidophilic 1st
8	slightly acidic soils / neutral soils	subacidophilic 2nd
9	neutral soils (pH=6.5-7.2)	neutrophilic
10	neutral soils / slightly alkaline soils	sub-alkaliphilic 1st
11	slightly alkaline soils (pH=7.2-8.0)	sub-alkaliphilic 2nd
12	slightly alkaline soils / alkaline soils	mesoalkaliphilic
13	alkaline soils (pH > 8.0)	alkaliphilic
	LC – habitat shading	
1	open areas	out-of-forest (light)
2	open areas / semi-open areas	glade (sub-light)
3	semi-open areas	shrub
4	semi-open areas / light forests	sparse forest
5	light forests	light forest
6	light forests / dark forests	dense light forest
7	dark forests	dark forests
8	dark forests / especially dark forests	thicket-shadow
9	especially dark forests	ultra-shadow
	FH – soil-moisture variability	
1	constant soil moisture	constantophilic 1st
2	constant soil moisture / relatively constant soil moisture	constantophilic 2nd
3	relatively constant soil moisture	sub-constantophilic 1st
4	relatively constant soil moisture / slightly variable soil moisture	sub-constantophilic 2nd
5	slightly variable soil moisture	hemi-constantophilic 1st
6	slightly variable soil moisture / moderately variable soil moisture	sub-constantophilic 2nd
7	moderately variable soil moisture	subcontrastophilic 1st
8	moderately variable soil moisture / highly variable soil moisture	subcontrastophilic 2nd
9	highly variable soil moisture	contrastophilic 1st
10	highly variable soil moisture / extremely variable soil moisture	contrastophilic 2nd
11	extremely variable soil moisture	contrastophilic 3rd

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