Table S1. Sequence lengths for the recognized domains of the 23S-16S ITS region. Two sequences were missing a portion of the ITS sequence, and the incomplete region where the sequence ended is denoted as „missing“. Note in particular the consistent differences between the three species in two genera that are evident in the four conserved helices (D1-D1‘, V2, V3, spacer to end of BoxB).

Strain	Leader	D1-D1‘ Helix	Spacer with D2 and D3	tRNA-Ile	V2 Helix	tRNA-Ala	Spacer to end of BoxB	Spacer to end of BoxA	D4 to V3	V3 Helix	Spacer including D5
A. pseudacutissimum Sai004	6	51	50	74	18	73	40	29	27	53	22
A. pseudacutissimum 29rlc4	6	51	50	74	18	73	41	29	27	53	22
A. pseudacutissimum JR23S123	6	51	50	74	18	73	41	29	27	53	22
A. pseudacutissimum CCALA150	6	51	50	74	18	73	41	29	27	53	22
A. pseudacutissimum CCALA151	6	51	50	74	18	73	40	29	27	53	22
A. pseudacutissimum M2	6	51	50	74	18	73	41	29	27	53	22
A. pseudacutissimum P004	6	51	51	74	18	73	41	29	27	53	22
A. pseudacutissimum CCALA142	6	51	50	74	18	73	40	29	27	53	22
A. pseudacutissimum AICB37	6	51	50	74	18	73	41	29	27	53	22
A. pseudacutissimum GSE-PSE048G	6	51	50	74	18			missing			
A. amphibium JR21S121	7	54	50	74	17	73	55	29	27	54	20
A. amphibium T14	7	54	50	74	17	73	55	29	27	53	20
A. amphibium HA4216-MV1	7	55	49	74	17	73	54	29	28	53	21
A. amphibium P013	7	54	50	74	17	73	54	29	29	54	21
A. amphibium VID46-MK80	7	55	50	74	17	73	54	29	29	missing	
A. amphibium MK72	7	54	50	74	17	73	56	29	missing		
Geitlerinema splendidum P014	7	61	53	74	36	73	65	29	19	47	22
Geitlerinema splendidum P017	7	61	53	74	36	73	65	29	19	47	22
Geitlerinema splendidum CCALA 1004	7	62	53	74	87	73	85	29	19	47	22

Table S2. List of traditional *Geitlerinema* species according their former morphologic designation. The species described in this manuscript are designated by X. Type species are marked T. The species assigned to *Geitlerinema* and *Anagnostidinema* by morphological similarity are marked M. The species marked U are species of unclear taxonomical status, which probably does not belong to *Geitlerinema* or *Anagnostidinema* although they were previously classified to *Geitlerinema*.

Geitlerinema	*splendidum*	TX
	apolloniae	M
	sandbergii	M
Anagnostidinema	*pseudacutissimum*	TX
	amphibium	X
	carotinosum	X
	acutissimum	M
	deflexum	M
	epiphloeophyticum	M
	exile	M
	ionicum	M
	lacus-solaris	M
	lemmermannii	M
	tenue	M
Geitlerinema	*acuiforme* (pointed ends)	MU
with unclear	*acus*	MU
generic status	*bigranulatum*	MU
	calcuttense	MU
	chilense	MU
	claricentrosum	MU
	crassum	MU
	earlei	MU
	jasorvense	MU
	leptotrichoides	MU
	major	MU
	nematodes (pointed ends)	MU
	numidicum	MU
	serpens	MU
	sp. sensu Silva & Pienaar 2000	MU
	sp. sensu Skuja 1956	MU
	sulphureum (= *Pseudanabaena* ?)	MU
	tenuius	MU
	thermale	MU
	unigranulatum	MU