

**Table S1:** Physicochemical properties of *AcGASA* family genes. Each gene is presented with its respective Gene ID, Chromosomal locations, length of coding region (CDS), Protein length (PL), Molecular weights of amino acid (MW), Isoelectric points (pI), Hydrophilicity score (GRAVY), Aliphatic index (AI), and predicted subcellular location.

Gene name	Gene ID	Chr location	CDS (bp)	PL (aa)	MW (kDa)	pI	GRAVY	AI	Subcellular localization
<i>AcGASA1</i>	Aco012370	LG01:2575624-2576905	273	90	10.08	9.07	-0.149	64.00	Cell membrane, Golgi, Nucleus
<i>AcGASA2</i>	Aco011225	LG01:13308868-13310528	285	94	10.17	8.48	0.007	72.66	Golgi
<i>AcGASA3</i>	Aco011224	LG01:13310793-13311280	192	63	6.96	9.16	-0.805	17.14	Golgi, Nucleus
<i>AcGASA4</i>	Aco001116	LG02:14120832-14122260	336	111	12.35	8.84	-0.307	56.31	Golgi
<i>AcGASA5</i>	Aco001067	LG02:14490031-14490928	288	95	10.3	8.98	0.014	58.53	Cell membrane, Golgi, Nucleus
<i>AcGASA6</i>	Aco000980	LG02:15218075-15218487	192	63	6.67	8.96	-0.398	29.52	Golgi, Nucleus
<i>AcGASA7</i>	Aco000979	LG02:15218868-15219954	351	116	12.37	8.59	0.011	69.14	Cell wall
<i>AcGASA8</i>	Aco002373	LG04:2068331-2070499	468	155	17.39	9.25	-0.691	45.42	Nucleus
<i>AcGASA9</i>	Aco004893	LG07:593092-593647	288	95	10.72	9.20	-0.229	74.00	Cell membrane, Golgi, Nucleus
<i>AcGASA10</i>	Aco008536	LG09:569695-571352	294	97	10.69	8.98	-0.070	71.44	Cell membrane, Cell wall, Golgi
<i>AcGASA11</i>	Aco000098	LG12:4718773-4719394	267	88	9.85	8.88	-0.365	54.43	Golgi
<i>AcGASA12</i>	Aco003244	LG17:1390314-1391450	345	114	12.51	9.23	-0.104	65.96	Golgi
<i>AcGASA13</i>	Aco015815	LG17:5770304-5771114	282	93	10.54	9.17	-0.932	38.92	Golgi, Nucleus
<i>AcGASA14</i>	Aco015632	LG19:1022203-1025827	321	106	11.52	8.65	-0.010	73.77	Nucleus
<i>AcGASA15</i>	Aco010336	LG25:1950442-1951286	204	67	7.12	8.79	-0.482	35.07	Golgi, Nucleus