



Quinoa phenological phases and their nutrition requirements

Crop cycle lasts approximately 180 days. Nutrient uptake increases intensively between 60 and 110 days after sowing. This period also coincides with the stage, at which biomass accumulation is most intensive. It is therefore evident that the period between 60 and 120 days after sowing is optimal and critical for abundant nutrients availability, because this is the stage that sustains the final yield.

Days after sowing	Nutrients uptake/stage (kg/ha of elemental form)						Proportional nutrients uptake					
	N	P	K	Ca	Mg	S	N	P	K	Ca	Mg	S
40	35	20	25	20	20	20	1,00	0,57	0,71	0,57	0,57	0,57
50	60	20	50	30	20	21	1,00	0,33	0,83	0,50	0,33	0,35
60	100	22	55	40	18	23	1,00	0,22	0,55	0,40	0,18	0,23
70	125	25	70	50	19	26	1,00	0,20	0,56	0,40	0,15	0,21
80	150	28	100	75	25	29	1,00	0,19	0,67	0,50	0,17	0,19
90	200	30	100	125	28	32	1,00	0,15	0,50	0,63	0,14	0,16
100	260	40	100	150	28	32	1,00	0,15	0,38	0,58	0,11	0,12
110	345	45	200	200	28	32	1,00	0,13	0,58	0,58	0,08	0,09
120	340	50	150	230	28	32	1,00	0,15	0,44	0,68	0,08	0,09
130	340	50	125	250	28	32	1,00	0,15	0,37	0,74	0,08	0,09
140	340	50	115	220	25	35	1,00	0,15	0,34	0,65	0,07	0,10
150	325	50	145	215	22	30	1,00	0,15	0,45	0,66	0,07	0,09
160	320	50	140	215	20	30	1,00	0,16	0,44	0,67	0,06	0,09
170	310	45	135	212	18	27	1,00	0,15	0,44	0,68	0,06	0,09
180	300	45	130	210	16	25	1,00	0,15	0,43	0,70	0,05	0,08
Means	237	38	109	149	22,9	28,4	1,00	0,20	0,51	0,60	0,15	0,17

Nitrogen N-NUE (nutrient use efficiency) can range from 11-15 to 22 kg/ha of yield per 1 kg of Nitrogen, while phosphorus P-NUE varies between 30 and 43 kg kg/ha of yield per 1 kg of Phosphorus.



Normal commercial yields for quinoa under Andes conditions are 1-2 MT/ha (=100-200 g/m²). Also, in Macedonia, South-Eastern Europe, seed yield of 1,72 MT/ha was obtained under rainfed conditions, without fertilization. 1,5-2,5 MT/ha of grain are normal in Bolivia, and yields touching 3,5 MT/ha are achieved in Peru. But up to 5 MT/ha (0,5 kg/m²) have been harvested in Mexico, by hand harvesting and bio-intensive growing methods.