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Table S1. Single-ion principal components of the g matrix of the Mn(III) centres in **1** and **2** and orientations with respect to the crystallographic frame of reference *XYZ* by means of Euler angles.

	g_{xx}	g_{yy}	g_{zz}	α/°	β/°	γ/°
Mn1 **(1)**	1.978	1.992	1.999	60.10	100.64	345.98
(2)	1.977	1.990	1.998	83.97	89.70	315.67
Mn2 **(1)**	1.982	1.994	1.998	38.01	141.29	144.04
(2)	1.978	1.992	1.998	144.19	117.42	340.11
Mn3 **(1)**	1.980	1.992	1.998	281.22	132.66	31.42
(2)	1.978	1.993	1.998	210.52	125.14	6.02

Table S2. Angles, in degrees, between the Jahn-Teller orientation and the AOM calculated D_{ZZ} component of the anisotropy tensor for the Mn(III) sites Mn1, Mn2, and Mn3, for compounds **1** and **2**.

	Mn1	Mn2	Mn3
1	4°°	7°	4°
2	15°	14°	13°

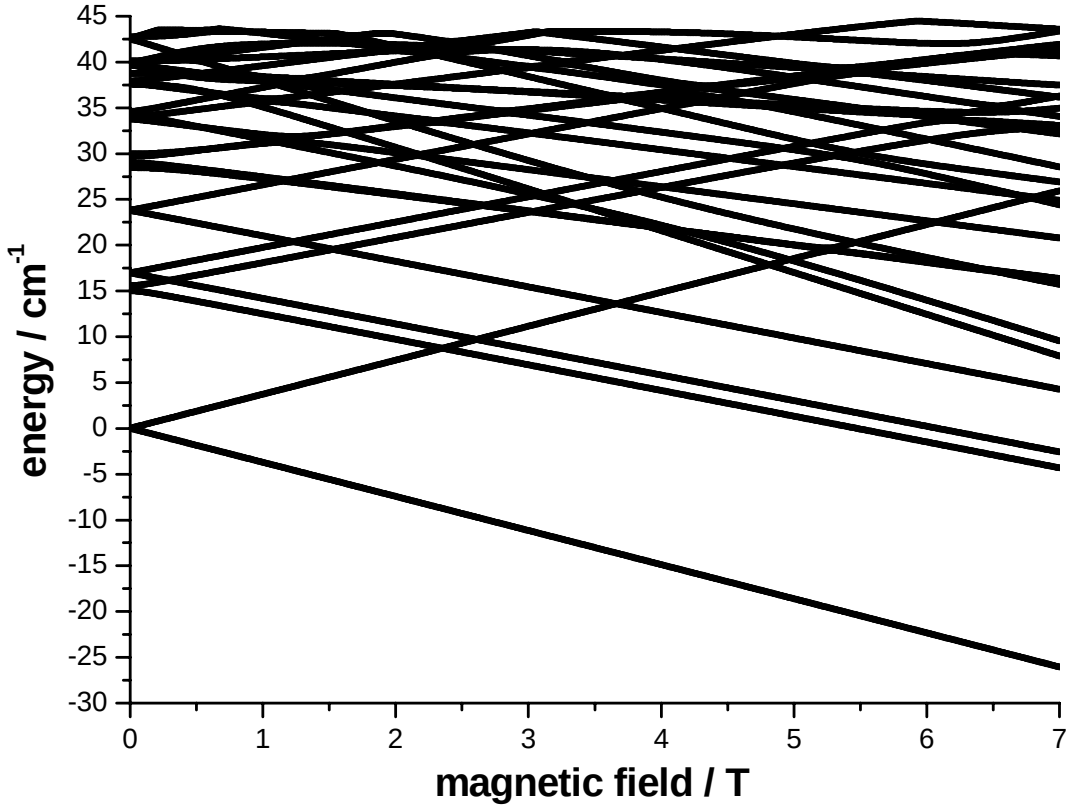

Figure S1. Field dependence of the eigenvalues of the twenty eight lowest lying eigenstates of **1** calculated as described in the text. The magnetic field is applied along the quantization axis (Z-axis).

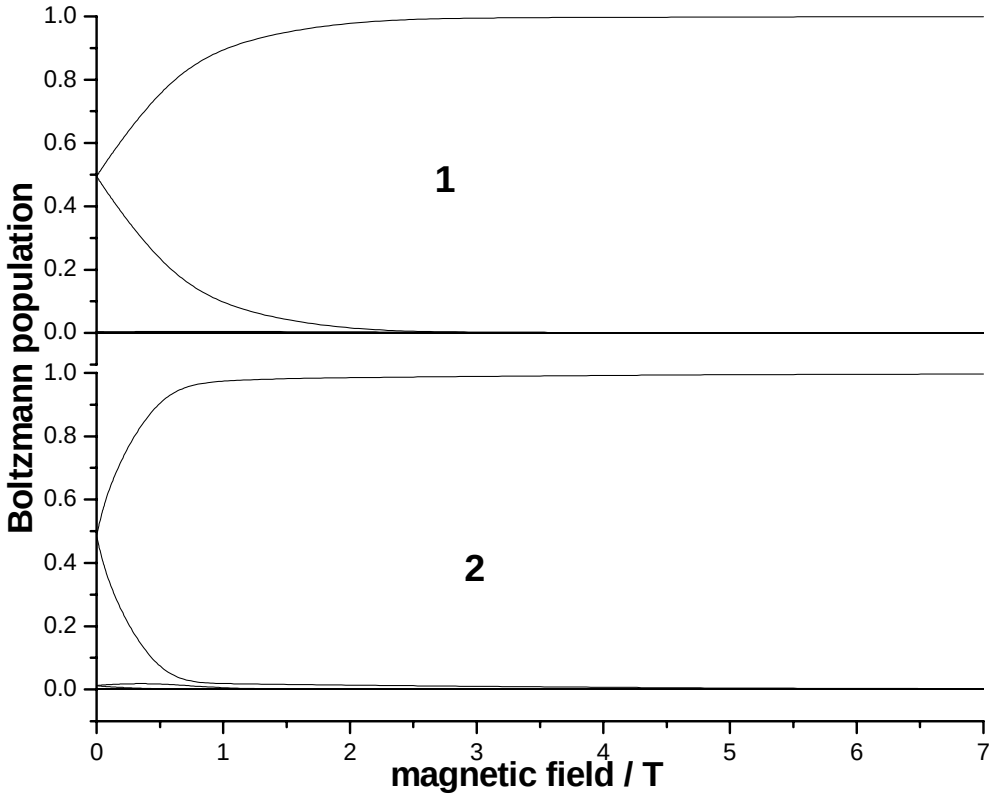

Figure S2. Field dependence of the Boltzmann population of the twenty eight lowest lying eigenstates of **1** (top) and of the forty eight eigenstates of **2** (bottom) determined by diagonalisation of the anisotropic spin-Hamiltonian (5) at 4.2 K.

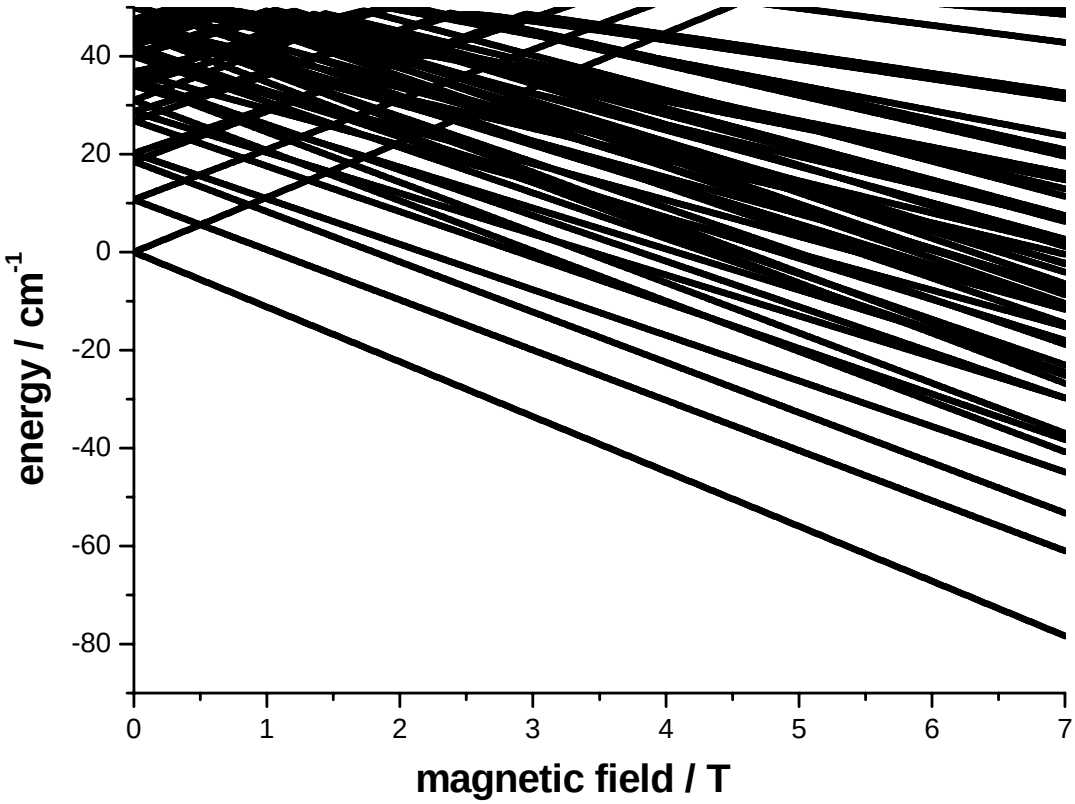

Figure S3. Field dependence of the eigenvalues of the forty eight lowest lying eigenstates of **2** calculated as described in the text. The magnetic field is applied along the quantization axis (Z-axis)