

Table S1. Sites with evidence for early millet use and cultivation; A)Peiligang Culture, B) Cishan Culture Sites, C) Houli Culture Sites, D) Xinglongwa Culture Sites, E) Dadiwan Culture Sites

Site	Province	Local Script	Culture	C14 Material	Code	Date	Error	Date	Cal. Start	Cal. Finish	Median	Calibrated 2 sigma	Comments	Crops	Cultivation Tools	References
HENAN: A) Peiligang Culture																
Peiligang	Henan	裴李岗	Peiligang	Mixed Charcoal	ZK-0572	9037	1000	9037±1000 BP	11170	6100	8635	11170-6100 cal. BC	Date rejected as error margin is too large and mixing of charcoal from different trenches; likely old wood problems and potential clay contamination.	Cited as Setaria. Question as to security of identification	spades	Lu (1999, table 4)
Peiligang	Henan	裴李岗	Peiligang	Mixed Charcoal	ZK-0434	7662	480	7662±480 BP	7730	5630	6680	7730-5630 cal. BC	Date taken from Zhang and Hung (2013, table 2), amended to 5568 half-life. Date is probably unreliable. Very large error margin and notably quite early; likely old wood.	As above	As above	Zhang and Hung (2013, table 2)
Peiligang	Henan	裴李岗	Peiligang	Charcoal	ZK-0754	7234	200	7234±200 BP	6470	5730	6100	6470-5730 cal. BC	Dates cited in Zhang and Hung (2013, Table 2) use 5730 half-life. Amended here to 5568 hl.	As above	As above	Zhang and Hung (2013, table 2)
Peiligang	Henan	裴李岗	Peiligang	Charcoal	ZK-0571	6967	105	6967±105 BP	6030	5660	5845	6030-5660 cal. BC	Dates cited in Zhang and Hung (2013, Table 2) use 5730 half-life. Amended here to 5568 hl.	As above	As above	Zhu (2013); Lu (1998; 1999, table 4)
Peiligang	Henan	裴李岗	Peiligang	Charcoal	ZK-0753	6981	200	6981±200 BP	6250	5510	5880	6250-5510 cal. BC	Dates cited in Zhang and Hung (2013, Table 2) use 5730 half-life. Amended here to 5568 hl.	As above	As above	Zhang and Hung (2013, table 2)
Peiligang	Henan	裴李岗	Peiligang	Charcoal	ZK-0751	6253	215	6253±215 BP	5620	4720	5170	5620-4720 cal. BC	Dates cited in Zhang and Hung (2013, Table 2) use 5730 half-life. Amended here to 5568 hl.	As above	As above	Zhang and Hung (2013, table 2)
Shawoli	Henan	沙窝李	Peiligang	Charcoal	ZK-1130	6967	105	6967±105 BP	6030	5660	5845	6030-5660 cal. BC	Dates cited in Zhang and Hung (2013, Table 2) use 5730 half-life. Amended here to 5568 hl.	Setaria	spades	Wang (1984); Lu (1998; 1999, table 4); Chen (1994); Zhang and Hung (2010); Zhu (2013)
Dingzhuang	Henan	丁庄	Peiligang	No date					est. 6000	est. 5000-6000 BC			Ceramic typology Peiligang	Setaria	?	Song (2011)
Fudian	Henan	府店	Peiligang	No date					est. 5500	est. 6000-5000 BC			Ceramics - Late Peiligang Culture	Setaria (small)	?	Lee et al. 2007; Bestel et al. 2014
Wuluoxipo	Henan	均罗西坡	Peiligang	Charcoal	Beta-404827	6360	30	6360±30 BP	5470	5230	5350	5470-5230 cal. BC		Setaria	spades	Zuo et al. (2016); Lee et al. 2007
Wuluoxipo	Henan	均罗西坡	Peiligang	phytolith	Beta-404848	6350	30	6350±30 BP	5470	5220	5345	5470-5220 cal. BC		Setaria	spades	Zuo et al. (2016); Lee et al. 2007
Shigu	Henan	石固	Peiligang	Charcoal	WB79-60	7239	90	7239±90 BP	6360	5920	6140	6360-5920 cal. BC	Dates cited in Zhang and Hung (2013, Table 2) use 5730 half-life. Amended here to 5568 hl.	Wild foods. No grains. But has cultivation tools	spades	Liu and Chen (2012); see also Zhang and Hung (2013)
Shigu	Henan	石固	Peiligang	Charcoal	WB80-15	7088	85	7088±85 BP	6200	5750	5975	6200-5750 cal. BC	As above	As above	As above	Liu and Chen (2012); see also Zhang and Hung (2013)
Shigu	Henan	石固	Peiligang	Charcoal	WB80-17	6911	85	6811±85 BP	5900	5560	5730	5900-5560 cal. BC	As above	As above	As above	Liu and Chen (2012); see also Zhang and Hung (2013)
Shuiguan	Henan	水泉	Peiligang	Charcoal	ZK-2345	7064	120	7064±120 BP	6210	5720	5965	6210-5720 cal. BC	Ceramics - Late Peiligang Culture	Possible Setaria	spades	Lu (1999, table 4)
Shuiguan	Henan	水泉	Peiligang	Charcoal	ZK-2344	6900	110	6900±110 BP	6000	5620	5810	6000-5620 cal. BC	As above	As above	As above	Lu (1999, table 4)
E'gou Beigang	Henan	裴沟北岗	Peiligang	Charcoal	ZK-580	7035	80	7035±80 BP	6050	5740	5895	6050-5740 cal. BC	Dates from Lu (2000)	Just wild foods	spades	Lu (1999, table 4)
E'gou Beigang	Henan	裴沟北岗	Peiligang	Charcoal	WB-7839	7060	160	7060±160 BP	6240	5640	5940	6240-5640 cal. BC	Dates from Lu (2000)	As above	As above	Lu (1999, table 4)
E'gou Beigang	Henan	裴沟北岗	Peiligang	Charcoal	WB-7838	6778	100	6778±100 BP	5890	5510	5700	5890-5510 cal. BC	Dates from Lu (2000)	As above	As above	Lu (1999, table 4)
E'gou Beigang	Henan	裴沟北岗	Peiligang	Charcoal	WB-7817	7083	120	7083±120 BP	6220	5730	5975	6220-5730 cal. BC	Dates cited in Zhang and Hung (2013, Table 2) use 5730 half-life. Amended here to 5568 hl.	As above	As above	Zhang and Hung (2013, table 2)
HEBEI: B) Cishan Culture																
Niuwaobao	Hebei	牛湾堡	Cishan	No date								6500-5000 cal. BC	Reported millet "piles" as seen at Cishan. See below	reported "millet" no formal identification	?	Ran (1996)
Cishan	Hebei	磁山	Cishan	Stated as "grain" but more likely sediment containing phytoliths	G21979-1982 +CNL188	9212 to 6708	77 to 48	9212±77 BP to 6708±48 BP	8620	5540	7080	8620-5540 cal. BC	Nine dates reported on millet grains have been dismissed. No flotation was conducted at the site and it is therefore questionable where the source of carbon for dating derived from. Dates span almost 3000 years and dates from single features are not statistically contemporary. Possibly phytolith rich sediments.	Setaria and Panicum identified from phytoliths. However, no charred grains have been recovered or identified	spades	Lu et al. (2009, fig 3)
Cishan	Hebei	磁山	Cishan	Charcoal	ZK-0439	7147	100	7147±100 BP	6240	5810	6025	6240-5810 cal. BC	Three charcoal dates suggest a date of around 5800-6000 BC and are consistent with unpublished new dates. NB. This date is reported using the incorrect 5730 half-life within Lu et al. 2009. Amended here to 5568 h.l.	As above	As above	Lu (1999, table 4); Lu et al. (2009, fig 3)
Cishan	Hebei	磁山	Cishan	Charcoal	ZK-0440	7030	100	7030±100 BP	6080	5710	5895	6080-5710 cal. BC	As above	As above	As above	Lu (1999, table 4); Lu et al. (2009, fig 3)
Cishan	Hebei	磁山	Cishan	Charcoal	BK-78029	6860	100	6860±100 BP	5990	5610	5800	5990-5610 cal. BC	As above	As above	As above	Lu (1999, table 4); Lu et al. (2009, fig 3)
Cishan	Hebei	磁山	Cishan	Unknown					~6000 BC	~6000 BC			New repeat dates by Wu Xiaohong cited in Zhang and Hung (2013)	As above	As above	Zhang and Hung (2013, table 2)
Beifudi	Hebei	北福地	Cishan	Charcoal	BK2004001	7100	55	7100±55 BP	5480	5320	5400	5480-5320 cal. BC	Dates are consistent but possibly slightly younger than Cishan e.g. 5500 to 6000 BC	No flotation	spades	Li et al. (2011)
Beifudi	Hebei	北福地	Cishan	Charcoal	BA04444	6990	30	6990±30 BP	5510	5300	5405	5510-5300 cal. BC	As above	As above	spades	Li et al. (2011)
Beifudi	Hebei	北福地	Cishan	Charcoal	BA03419	6440	60	6440±60 BP	5990	5780	5885	5990-5780 cal. BC	As above	As above	spades	Li et al. (2011)
Beifudi	Hebei	北福地	Cishan	Charcoal	BA04252	6430	40	6430±40 BP	6070	5840	5955	6070-5840 cal. BC	As above	As above	spades	Li et al. (2011)
SHANGDONG: C) Houli Culture Sites																
Yuezhuang	Shandong	月庄	Houli	Rice grains	TO-11865	7050	80	7050±80 BP	6060	5750	5905	6060-5750 cal. BC	Houli Culture the dates are broadly contemporary with Cishan. Millets are seen to be in early stages of cultivation (Crawford et al. 2016).	Mainly Panicum and Oryza, but some Setaria; unclear if rice is cultivated/domesticated.	Possible cultivation tools are known for Houli sites. But low in number.	Crawford et al. (2006; 2016)
Yuezhuang	Shandong	月庄	Houli	Millet Grains	BA-8168	6900	35	6900±35 BP	5880	5710	5795	5880-5710 cal. BC	As above. Direct dates on Panicum	As above	As above	Crawford et al. (2006; 2016)
Xihe	Shandong	西河	Houli	Rice grain (H358)	BA10679	7090	30	7090±30 BP	6030	5900	5965	6030-5900 cal. BC	As above	Oryza x74, Setaria x2. Unclear if rice is cultivated/domesticated	See comment above	Jin, G. et al. (2014)
Xihe	Shandong	西河	Houli	Rice grain (H358)	BA10680	7115	30	7115±30 BP	6060	5910	5985	6060-5910 cal. BC	As above	As above	See comment above	Jin, G. et al. (2014)
Xihe	Shandong	西河	Houli	Rice grain (H358)	BA10681	7165	30	7165±30 BP	6080	5990	6035	6080-5990 cal. BC	As above	As above	See comment above	Jin, G. et al. (2014)
Xihe	Shandong	西河	Houli	Rice grain (H358)	BA10682	7165	25	7165±25 BP	6070	5990	6030	6070-5990 cal. BC	As above	As above	See comment above	Jin, G. et al. (2014)
Xihe	Shandong	西河	Houli	Grape (H305)	BA10683	7085	30	7085±30 BP	6020	5900	5960	6020-5900 cal. BC	As above	As above	See comment above	Jin, G. et al. (2014)
Xihe	Shandong	西河	Houli	Grape (H305)	BA10686	7120	30	7120±30 BP	6060	5920	5990	6060-5920 cal. BC	As above	As above	See comment above	Jin, G. et al. (2014)
Nantunling	South Shandong	南屯岭	Late Beixin	Not C14 dated					5000	4500	4750	5000-4500 cal. BC	Site represents early millet finds after gap of a millennia	2 Setaria, 3 Panicum	See comment above	Chen 2007; Underhill et al. 2008
Zhangmatun	Shandong	张马屯	Early Houli	Grape (T0113)	BA10698	8000	30	8000±30 BP	7060	6810	6935	7060-6810 cal. BC	The same sample with grape and millets has intrusive wheat grains. Dates appear at least 500 years older than Houli culture and 1000 years older than Xihe and Yuezhuang	2 Setaria 6 Panicum. No rice. As the wheat grains are intrusive the millet grains should be regarded with caution	No obvious cultivation tools	Wu et al. (2014)
Zhangmatun	Shandong	张马屯	Early Houli	Grape (T0113)	BA10697	8050	30	8050±30 BP	7080	6820	6950	7080-6820 cal. BC	As above	As above	No obvious cultivation tools	Wu et al. (2014)
Zhangmatun	Shandong	张马屯	Early Houli	Grape (T0113)	BA10693	7965	35	7965±35 BP	7050	6700	6875	7050-6700 cal. BC	As above	As above	No obvious cultivation tools	Wu et al. (2014)
Zhangmatun	Shandong	张马屯	Early Houli	Grape (T0113)	BA10694	7820	30	7820±30 BP	6740	6590	6665	6740-6590 cal. BC	As above	As above	No obvious cultivation tools	Wu et al. (2014)
INNER MONGOLIA: D) Xinglongwa Culture Sites																
Xinglonggou	Inner Mongolia	兴隆沟	Xinglongwa	Panicum	not given	n/a	n/a	not given	5720	5660	5690	5720-5660 cal. BC	The uncalibrated date is not available - and there is some variability to how it is quoted. However, it is one of the few direct dates on millet grains.	Mainly Panicum, some setaria. Millet remains are sparse in many contexts comparatively to wild food remains	Present	Zhao, Z (2011)
Xinglongwa	Inner Mongolia	兴隆洼	Xinglongwa	Sone; house 2	ZK-1389	5499	170	5499±170 BP	4710	3970	4340	4710-3970 cal. BC	Dates quoted by Shelach and Teng (2013) and Lu (1998) are 5730 half-life. Dates here are corrected to the 5568 half-life. Date regarded as too young	isotope data suggests that millet consumption is indirect e.g. through consumption of millet eating animals (see Hu et al. 2008).	Stone tools present. Regarded as more "tree like" than "spade like" compared to tools of Peiligang Culture	Shelach and Teng (2013, table 3.1); Lu (1999, table 2)
Xinglongwa	Inner Mongolia	兴隆洼	Xinglongwa	charcoal; house 119	ZK-1390	6700	205	6700±205 BP	6020	5230	5625	6020-5230 cal. BC	As above dates here are corrected to the 5568 half-life. Date broadly contemporary with Xinglonggou.	As above	As above	Shelach and Teng (2013, table 3.1); Lu (1999, table 2)
Xinglongwa	Inner Mongolia	兴隆洼	Xinglongwa	charcoal; house 119	ZK-1391	7258	115	7258±115 BP	6400	5910	6155	6400-5910 cal. BC	As above dates here are corrected to the 5568 half-life. Date regarded as too old. Probable old wood charcoal. It is from the same house infill as two younger dates.	As above	As above	Shelach and Teng (2013, table 3.1); Lu (1999, table 2)

Site	Province	Local Script	Culture	C14 Material	Code	Date	Error	Date	Cal. Start	Cal. Finish	Median	Calibrated 2 sigma	Comments	Crops	Cultivation Tools	References
Xinglongwa	Inner Mongolia	兴隆洼	Xinglongwa	charcoal; house 119	ZK-1392	7035	95	7035±95 BP	6070	5720	5895	6070-5720 cal. BC	As above dates here are corrected to the 5568 half life. Broadly contemporary with Xinglonggou	As above	As above	Shelach and Teng (2013, table 3.1); Lu (1999, table 2)
Xinglongwa	Inner Mongolia	兴隆洼	Xinglongwa	charcoal; house 121	ZK-1393	6768	95	6768±95 BP	5880	5510	5695	5880-5510 cal. BC	As above dates here are corrected to the 5568 half life. Date broadly contemporary with Xinglonggou	As above	As above	Shelach and Teng (2013, table 3.1); Lu (1999, table 2)
Xinglongwa	Inner Mongolia	兴隆洼	Xinglongwa	charcoal; house 133	ZK-1394	5699	90	5699±90 BP	4730	4350	4540	4730-4350 cal. BC	As above dates here are corrected to the 5568 half life. Dates are too young	As above	As above	Lu (1999, table 2)
Xinglongwa	Inner Mongolia	兴隆洼	Xinglongwa	charcoal; house 142	ZK-2064	5572	85	5572±85 BP	4610	4250	4430	4610-4250 cal. BC	As above dates here are corrected to the 5568 half life. Dates are too young	As above	As above	Lu (1999, table 2)
Xinglongwa	Inner Mongolia	兴隆洼	Xinglongwa	charcoal	ZK-3070	6504	48	6504±48 BP	5560	5360	5460	5560-5360 cal. BC	As above dates here are corrected to the 5568 half life. Date broadly contemporary with Xinglonggou	As above	As above	Shelach and Teng (2013, table 3.1)
Xinglongwa	Inner Mongolia	兴隆洼	Xinglongwa	charcoal	ZK-3074	5271	53	5271±53 BP	4240	3970	4105	4240-3970 cal. BC	As above dates here are corrected to the 5568 half life. Dates are too young	As above	As above	Shelach and Teng (2013, table 3.1)
Xinglongwa	Inner Mongolia	兴隆洼	Xinglongwa	charcoal	ZK-3075	4987	54	4987±54 BP	3950	3650	3800	3950-3650 cal. BC	As above dates here are corrected to the 5568 half life. Dates are too young	As above	As above	Shelach and Teng (2013, table 3.1)
Zhaobaogou	Inner Mongolia	赵宝沟	Zhaobaogou	charcoal	ZK-2135	6034	95	6034±95 BP	5210	4720	4965	5210-4720 cal. BC	Dates quoted by Shelach and Teng (2013); Lu (1998) are all at 5730 half-life. Dates here are corrected to the 5568 half life	No flotation	Stone cultivation tools present	Shelach and Teng (2013, table 3.1); Lu (1999, table 2)
Zhaobaogou	Inner Mongolia	赵宝沟	Zhaobaogou	charcoal	ZK-2136	6044	95	6044±95 BP	5220	4720	4970	5220-4720 cal. BC	As above dates here are corrected to the 5568 half life	No flotation	As above	Shelach and Teng (2013, table 3.1); Lu (1999, table 2)
Zhaobaogou	Inner Mongolia	赵宝沟	Zhaobaogou	charcoal	ZK-2137	5980	95	5980±95 BP	5210	4620	4915	5210-4620 cal. BC	As above dates here are corrected to the 5568 half life	No flotation	As above	Shelach and Teng (2013, table 3.1); Lu (1999, table 2)
Baiyinchanghan	Inner Mongolia	白音长汗	Xinglongwa	charcoal	WB-90-2	6840	100	6840±100 BP	5980	5560	5770	5980-5560 cal. BC	Dates quoted by Shelach and Teng (2013) may be quoted at 5730 half-life (as suggested by dates given in Barton 2009). Dates are therefore corrected to the 5568 half life. Broadly contemporary with Xinglonggou/Xinglongwa	Starch analysis revealed millet starch	Present	Shelach and Teng (2013, table 3.1)
Baiyinchanghan	Inner Mongolia	白音长汗	Xinglongwa	charcoal	WB-90-1	6403	85	6403±85 BP	5530	5210	5370	5530-5210 cal. BC	As above. Broadly contemporary/ slightly younger than Xinglonggou/Xinglongwa	as above	Present	Shelach and Teng (2013, table 3.1)
Chahai	Inner Mongolia	查海	Xinglongwa	charcoal	ZK-2138	6729	95	6729±95 BP	5810	5480	5645	5810-5480 cal. BC	Dates quoted by Shelach and Teng (2013); Lu (1998) are all at 5730 half-life. Dates here are corrected to the 5568 half life. Broadly contemporary with other Xinglongwa sites	No flotation	Present	Shelach and Teng (2013, table 3.1); Lu (1999, table 2)
Chahai	Inner Mongolia	查海	Xinglongwa	charcoal	BA-93001	7151	150	7151±150 BP	6360	5730	6045	6360-5730 cal. BC	As above	No flotation	Present	Shelach and Teng (2013, table 3.1); Lu (1999, table 2)
Nantalzi	Inner Mongolia	南台子	Xinglongwa	No date								est. 6000-4000 BC	dated by material culture	No flotation	Present	Shelach and Teng (2013, table 3.1)
GANSU: E) Dadiwan Culture Sites																
Dadiwan	Gansu	大地湾	Dadiwan	bone collagen	CAMS 134422	6615	35	6615±35 BP	5620	5490	5555	5620-5490 cal. BC	from Barton et al. (2009)	Panicum only	very small number of cultivation tools	Barton et al. (2009)
Dadiwan	Gansu	大地湾	Dadiwan	bone collagen	CAMS 134423	6645	30	6645±30 BP	5630	5520	5575	5630-5520 cal. BC	from Barton et al. (2009)	Panicum only	As above	Barton et al. (2009)
Dadiwan	Gansu	大地湾	Dadiwan	bone collagen	CAMS 134424	6580	30	6580±30 BP	5620	5480	5550	5620-5480 cal. BC	from Barton et al. (2009)	Panicum only	As above	Barton et al. (2009)
Dadiwan	Gansu	大地湾	Dadiwan	bone collagen	CAMS 134427	6280	30	6280±30 BP	5320	5210	5265	5320-5210 cal. BC	from Barton et al. (2009)	Panicum only	As above	Barton et al. (2009)
Dadiwan	Gansu	大地湾	Dadiwan	bone collagen	CAMS 134452	6720	40	6720±40 BP	5720	5560	5640	5720-5560 cal. BC	from Barton et al. (2009)	Panicum only	As above	Barton et al. (2009)
Dadiwan	Gansu	大地湾	Dadiwan	bone collagen	CAMS 134453	6690	40	6690±40 BP	5680	5520	5600	5680-5520 cal. BC	from Barton et al. (2009)	Panicum only	As above	Barton et al. (2009)
Qin'an I	Gansu	秦安	Dadiwan	No date								est. 6000-5500 BC	Li et al. (2015). No C14 date given. Figure 6 indicates the site is contemporary with Dadiwan I	Panicum only	?	Li et al. (2015)
Qin'an II	Gansu	秦安	Dadiwan	No date								est. 4300-4000 BC	Date is broadly given as Banpo period.	Panicum and Setaria	?	Li et al. (2015)
Qin'an QA10	Gansu	秦安	Late Banpo Yangshao	Panicum milaceum	CAMS 128457	4965	40	4965±40 BP	3930	3650	3790	3930-3650 cal. BC	Dates of sites in Gansu suggest a hiatus between the Dadiwan and Banpo periods	Panicum and Setaria	?	Ji (2009); Li et al. (2015)
Qin'an QA10	Gansu	秦安	Late Banpo Yangshao	charcoal	CAMS 128100	5080	30	5080±30 BP	3960	3790	3875	3960-3790 cal. BC	Dates of sites in Gansu suggest a hiatus between the Dadiwan and Banpo periods	Panicum and Setaria	?	Ji (2009); Li et al. (2015)
Lixian LX12/LX002 Heituya	Gansu	礼县 LX12	Banpo Yangshao	charcoal	CAMS 94205	5360	35	5360±35 BP	4330	4050	4190	4330-4050 cal. BC	The same date CAMS 94205 is given in Barton (2009) for LX002 and in Ji (2009) for LX12	Panicum and Setaria	?	Ji (2009); Barton (2009); Bettinger et al. (2005)