

Table S1. Details information of 272 natural population materials for genome-wide association analysis.

| Accession-ID | Accession-name    | Province  | Chinese wheat plant zone <sup>a</sup> | Group <sup>b</sup> |
|--------------|-------------------|-----------|---------------------------------------|--------------------|
| AS661005     | baixiaomai        | beijing   | NW                                    | Group1             |
| AS661006     | baimangmai        | beijing   | NW                                    | Group1             |
| AS661009     | tumai             | beijing   | NW                                    | Group1             |
| AS661012     | henanbai          | beijing   | NW                                    | Group1             |
| AS661016     | daqingmang        | tianjin   | NW                                    | Group1             |
| AS661017     | hongmangbai       | tianjin   | NW                                    | Group1             |
| AS661018     | baihulutou        | tianjin   | NW                                    | Group1             |
| AS661019     | xiaobaimang       | hebei     | Y&H                                   | Group1             |
| AS661021     | youzimai          | hebei     | Y&H                                   | Group1             |
| AS661024     | baipibai          | hebei     | NW                                    | Group1             |
| AS661027     | xiaomaimang       | hebei     | Y&H                                   | Group1             |
| AS661030     | gongxianmai       | hebei     | Y&H                                   | Group1             |
| AS661035     | baike             | hebei     | NW                                    | Group1             |
| AS661037     | dabaimai          | hebei     | Y&H                                   | Group1             |
| AS661038     | dabailing         | hebei     | Y&H                                   | Group1             |
| AS661039     | zijingbai         | hebei     | NW                                    | Group1             |
| AS661041     | xiaobaipi         | hebei     | Y&H                                   | Group1             |
| AS661042     | liulengmai        | hebei     | Y&H                                   | Group1             |
| AS661046     | erguangtou        | hebei     | NW                                    | Group1             |
| AS661054     | daqitou           | hebei     | NW                                    | Group1             |
| AS661056     | tutoubai          | hebei     | NW                                    | Group1             |
| AS661065     | dabaimang         | hebei     | NW                                    | Group1             |
| AS661066     | chunqiumaizi      | hebei     | NW                                    | Group1             |
| AS661071     | hongmangbai       | hebei     | Y&H                                   | Group1             |
| AS661073     | baimangmai        | hebei     | Y&H                                   | Group1             |
| AS661074     | guchengxiaomai    | hebei     | Y&H                                   | Group1             |
| AS661075     | gaochan1hao       | hebei     | Y&H                                   | Group1             |
| AS661076     | honghulubaimai    | hebei     | Y&H                                   | Group1             |
| AS661078     | dahongmang        | hebei     | Y&H                                   | Group1             |
| AS661079     | baikebai          | hebei     | Y&H                                   | Group1             |
| AS661080     | baihulutou        | hebei     | Y&H                                   | Group1             |
| AS661097     | xiaomangmai       | shanxi    | NW                                    | Group1             |
| AS661104     | baimanghong       | shanxi    | NW                                    | Group1             |
| AS661110     | baixianmang       | shanxi    | NW                                    | Group1             |
| AS661112     | youmangshangeda   | shanxi    | NW                                    | Group1             |
| AS661116     | baishanmai        | shanxi    | NW                                    | Group1             |
| AS661119     | jinbaoyu          | shangdong | Y&H                                   | Group1             |
| AS661120     | banmangmai        | shandong  | Y&H                                   | Group1             |
| AS661123     | bo'erqing         | shandong  | Y&H                                   | Group1             |
| AS661126     | hongmangxiaomai   | shangdong | Y&H                                   | Group1             |
| AS661129     | xiaogongxian      | shandong  | Y&H                                   | Group1             |
| AS661132     | baishamai         | shandong  | Y&H                                   | Group1             |
| AS661134     | xiaobiansui       | shandong  | Y&H                                   | Group1             |
| AS661137     | baitutou          | shangdong | Y&H                                   | Group1             |
| AS661138     | banjiemangdabai   | shandong  | Y&H                                   | Group1             |
| AS661139     | mazhatoumai       | shangdong | Y&H                                   | Group1             |
| AS661140     | hongmanghongmai   | shangdong | Y&H                                   | Group1             |
| AS661145     | baikumai          | shangdong | Y&H                                   | Group1             |
| AS661150     | hongheshang       | shandong  | Y&H                                   | Group1             |
| AS661162     | iaohongmangliangm | shandong  | Y&H                                   | Group1             |
| AS661163     | piaoxiao          | shangdong | Y&H                                   | Group1             |

Table S1. Details information of 272 natural population materials for genome-wide association analysis.

| Accession-ID | Accession-name  | Province       | Chinese wheat plant zone <sup>a</sup> | Group <sup>b</sup> |
|--------------|-----------------|----------------|---------------------------------------|--------------------|
| AS661164     | baitumai        | shangdong      | Y&H                                   | Group1             |
| AS661166     | hongduomai      | shangdong      | Y&H                                   | Group1             |
| AS661174     | yulincao        | shangdong      | Y&H                                   | Group1             |
| AS661179     | baimangyouzi    | henan          | Y&H                                   | Group1             |
| AS661182     | baigedatou      | henan          | Y&H                                   | Group1             |
| AS661187     | xiaozibai       | henan          | Y&H                                   | Group1             |
| AS661205     | wuhuatou        | henan          | Y&H                                   | Group1             |
| AS661208     | laochushanbao   | henan          | Y&H                                   | Group1             |
| AS661221     | zihuatou        | henan          | Y&H                                   | Group1             |
| AS661243     | shihuiyaohuomai | shaanxi        | NW                                    | Group1             |
| AS661251     | nv'erhong       | shaanxi        | NW                                    | Group1             |
| AS661256     | gouweibabaimai  | shaanxi        | Y&H                                   | Group1             |
| AS661259     | laobaitiaozi    | shaanxi        | NW                                    | Group1             |
| AS661281     | xiaohongmang    | heilongjiang   | NES                                   | Group1             |
| AS661284     | xuemai          | jilin          | NES                                   | Group1             |
| AS661287     | xinjinyoumang   | liaoning       | NW                                    | Group1             |
| AS661289     | xiaozhihongmai  | liaoning       | NW                                    | Group1             |
| AS661335     | baiqimai        | gansu          | NW                                    | Group1             |
| AS661337     | xiaoqingmang    | gansu          | NW                                    | Group1             |
| AS661357     | kuchebaidongmai | xinjiang       | XJ                                    | Group1             |
| AS661445     | baisuihong      | jiangsu        | YTS                                   | Group1             |
| AS661453     | xiaoyuhua       | jiangsu        | YTS                                   | Group1             |
| AS661695     | xiaobaipi       | inner mongolia | NS                                    | Group1             |
| AS661725     | yejihong        | shangdong      | Y&H                                   | Group1             |
| AS661824     | baijiantiao     | shaanxi        | NW                                    | Group1             |
| AS661980     | dingrichangmang | tibet          | Q&T                                   | Group1             |
| AS661103     | zhuganqing      | shanxi         | NW                                    | Group2             |
| AS661149     | baikangyangmai  | shangdong      | Y&H                                   | Group2             |
| AS661191     | kumai           | henan          | Y&H                                   | Group2             |
| AS661194     | pushanbamai     | henan          | Y&H                                   | Group2             |
| AS661203     | baitiaoyu       | henan          | Y&H                                   | Group2             |
| AS661207     | tutoumai        | henan          | Y&H                                   | Group2             |
| AS661216     | youmangcao      | henan          | Y&H                                   | Group2             |
| AS661217     | dalihong        | henan          | Y&H                                   | Group2             |
| AS661222     | benmai          | henan          | Y&H                                   | Group2             |
| AS661224     | qumangmai       | henan          | Y&H                                   | Group2             |
| AS661226     | xiaobaimai      | henan          | YTS                                   | Group2             |
| AS661231     | baiheshangtou   | henan          | Y&H                                   | Group2             |
| AS661233     | yerenmao        | henan          | Y&H                                   | Group2             |
| AS661234     | xiaozihong      | henan          | Y&H                                   | Group2             |
| AS661236     | youmangcao      | henan          | YTS                                   | Group2             |
| AS661237     | huomai          | henan          | YTS                                   | Group2             |
| AS661239     | baihuomai       | henan          | Y&H                                   | Group2             |
| AS661380     | jianzituan      | jiangsu        | YTS                                   | Group2             |
| AS661389     | huanghuazhu     | jiangsu        | YTS                                   | Group2             |
| AS661392     | yejihong        | jiangsu        | YTS                                   | Group2             |
| AS661396     | huoshaotian     | jiangsu        | YTS                                   | Group2             |
| AS661398     | guangdezao      | jiangsu        | YTS                                   | Group2             |
| AS661412     | nuopangtou      | jiangsu        | YTS                                   | Group2             |
| AS661414     | daoshuibai      | jiangsu        | YTS                                   | Group2             |
| AS661416     | baizhaoyu       | jiangsu        | YTS                                   | Group2             |

Table S1. Details information of 272 natural population materials for genome-wide association analysis.

| Accession-ID | Accession-name   | Province  | Chinese wheat plant zone <sup>a</sup> | Group <sup>b</sup> |
|--------------|------------------|-----------|---------------------------------------|--------------------|
| AS661421     | qingmangzi       | jiangsu   | YTS                                   | Group2             |
| AS661423     | huaqixiaomai     | jiangsu   | YTS                                   | Group2             |
| AS661425     | manghuazi        | jiangsu   | YTS                                   | Group2             |
| AS661428     | baimangzi        | jiangsu   | YTS                                   | Group2             |
| AS661430     | dahongpi         | jiangsu   | YTS                                   | Group2             |
| AS661435     | zhuantoubaike    | jiangsu   | Y&H                                   | Group2             |
| AS661436     | hongmai          | jiangsu   | Y&H                                   | Group2             |
| AS661440     | xiaoli hong      | jiangsu   | Y&H                                   | Group2             |
| AS661452     | shunshui hong    | jiangsu   | YTS                                   | Group2             |
| AS661454     | putaomai         | shanghai  | YTS                                   | Group2             |
| AS661455     | baijiaomai       | shanghai  | YTS                                   | Group2             |
| AS661460     | huxumai          | anhui     | YTS                                   | Group2             |
| AS661461     | wugongmai        | anhui     | YTS                                   | Group2             |
| AS661462     | jiangxizao       | anhui     | YTS                                   | Group2             |
| AS661463     | wugongbian       | anhui     | YTS                                   | Group2             |
| AS661473     | dujiaqiaoxiaomai | zhejiang  | YTS                                   | Group2             |
| AS661477     | baixu            | zhejiang  | YTS                                   | Group2             |
| AS661479     | baikeguangtou    | zhejiang  | YTS                                   | Group2             |
| AS661483     | hongkewugong     | zhejiang  | YTS                                   | Group2             |
| AS661498     | tiezhuantou      | zhejiang  | YTS                                   | Group2             |
| AS661502     | xianjumai        | zhejiang  | YTS                                   | Group2             |
| AS661507     | qingtianmai      | zhejiang  | YTS                                   | Group2             |
| AS661510     | hongtoumai       | zhejiang  | YTS                                   | Group2             |
| AS661511     | xiyangmai        | zhejiang  | YTS                                   | Group2             |
| AS661521     | wugongmai        | zhejiang  | YTS                                   | Group2             |
| AS661527     | tiegengqing      | zhejiang  | YTS                                   | Group2             |
| AS661528     | zaoxiaomai       | zhejiang  | YTS                                   | Group2             |
| AS661542     | qiyanghongke     | hunan     | YTS                                   | Group2             |
| AS661547     | heshangmai       | hunan     | YTS                                   | Group2             |
| AS661549     | baikeyoumang     | fujian    | SAS                                   | Group2             |
| AS661554     | youmai           | guangdong | SAS                                   | Group2             |
| AS661555     | datianquxiaomai  | guangdong | SAS                                   | Group2             |
| AS661558     | qingyuanxiaomai  | guangdong | SAS                                   | Group2             |
| AS661560     | huoshaomai       | guangdong | SAS                                   | Group2             |
| AS661562     | baikexiaomai     | guangdong | SAS                                   | Group2             |
| AS661563     | zaoxiaomai       | guangdong | SAS                                   | Group2             |
| AS661566     | zhangmuxiaomai   | guangxi   | SAS                                   | Group2             |
| AS661569     | guangtoumai      | guangxi   | SAS                                   | Group2             |
| AS661602     | hongxumai        | sichuan   | SWAS                                  | Group2             |
| AS661626     | baikejiang       | sichuan   | SWAS                                  | Group2             |
| AS661655     | baimaier         | sichuan   | SWAS                                  | Group2             |
| AS661671     | guangtoumai      | guizhou   | SWAS                                  | Group2             |
| AS661675     | hongmangmai      | guizhou   | SWAS                                  | Group2             |
| AS661676     | liulengmai       | guizhou   | SWAS                                  | Group2             |
| AS661684     | yangmaizi        | yunnan    | SWAS                                  | Group2             |
| AS661703     | baiyuhua         | jiangsu   | YTS                                   | Group2             |
| AS661705     | nanjinghuang     | jiangsu   | YTS                                   | Group2             |
| AS661706     | zhenjiang3-96    | jiangsu   | YTS                                   | Group2             |
| AS661715     | heshangmai       | fujian    | SAS                                   | Group2             |
| AS661717     | guangtoumai      | jiangxi   | YTS                                   | Group2             |
| AS661732     | changshamai      | hubei     | YTS                                   | Group2             |

Table S1. Details information of 272 natural population materials for genome-wide association analysis.

| Accession-ID | Accession-name     | Province       | Chinese wheat plant zone <sup>a</sup> | Group <sup>b</sup> |
|--------------|--------------------|----------------|---------------------------------------|--------------------|
| AS661739     | zhuganqing         | hubei          | YTS                                   | Group2             |
| AS661746     | xiaoganmai         | hubei          | YTS                                   | Group2             |
| AS661751     | tiezimai           | hubei          | YTS                                   | Group2             |
| AS661755     | quanmangxiaomai    | hubei          | YTS                                   | Group2             |
| AS661756     | xishuibagutao      | hubei          | YTS                                   | Group2             |
| AS661757     | zimai              | hubei          | YTS                                   | Group2             |
| AS661759     | wugongmai          | hubei          | YTS                                   | Group2             |
| AS661762     | baikeheshangmai    | hunan          | YTS                                   | Group2             |
| AS661806     | shanyangxue        | shaanxi        | NW                                    | Group2             |
| AS661814     | bailanmai          | shaanxi        | Y&H                                   | Group2             |
| AS661850     | cantiaomai         | shaanxi        | NW                                    | Group2             |
| AS662012     | xiaohongmang       | jiangsu        | Y&H                                   | Group2             |
| AS662043     | bomiduanqu         | tibet          | Q&T                                   | Group2             |
| WH094        | huangshuibai       | zhejiang       | YTS                                   | Group2             |
| AS661184     | cantiaomai         | henan          | Y&H                                   | Group3             |
| AS661227     | liangganbai        | henan          | YTS                                   | Group3             |
| AS661250     | siqiangxiaomai     | shaanxi        | NW                                    | Group3             |
| AS661254     | daqimai            | shaanxi        | Y&H                                   | Group3             |
| AS661258     | yu'ermai           | shaanxi        | Y&H                                   | Group3             |
| AS661564     | puningxiaomai      | guangdong      | SAS                                   | Group3             |
| AS661571     | sanyuehuang        | sichuan        | SWAS                                  | Group3             |
| AS661582     | wuyangmai          | sichuan        | SWAS                                  | Group3             |
| AS661583     | huangmaizi         | sichuan        | SWAS                                  | Group3             |
| AS661584     | yuzuiweimai        | sichuan        | SWAS                                  | Group3             |
| AS661586     | youtiaomai         | sichuan        | SWAS                                  | Group3             |
| AS661587     | dahonghua          | sichuan        | SWAS                                  | Group3             |
| AS661593     | zaohuangmai        | sichuan        | SWAS                                  | Group3             |
| AS661596     | hongtiaomai        | sichuan        | SWAS                                  | Group3             |
| AS661605     | lushanmai          | sichuan        | SWAS                                  | Group3             |
| AS661609     | tuotuomai          | sichuan        | SWAS                                  | Group3             |
| AS661615     | yuweimai           | sichuan        | SWAS                                  | Group3             |
| AS661616     | hechuanmai         | sichuan        | SWAS                                  | Group3             |
| AS661617     | huayangxiaomai     | sichuan        | SWAS                                  | Group3             |
| AS661619     | huanghuaxiaomai    | sichuan        | SWAS                                  | Group3             |
| AS661620     | guangguangtou      | sichuan        | SWAS                                  | Group3             |
| AS661634     | hongmangmaizi      | sichuan        | Q&T                                   | Group3             |
| AS661637     | zaodongmai         | sichuan        | SWAS                                  | Group3             |
| AS661642     | yicuomao           | sichuan        | SWAS                                  | Group3             |
| AS661658     | aikexuxusanyuehuar | sichuan        | SWAS                                  | Group3             |
| AS661679     | tiekema            | yunnan         | SWAS                                  | Group3             |
| AS661683     | zimai              | yunnan         | SWAS                                  | Group3             |
| AS661747     | caoxieban          | hubei          | YTS                                   | Group3             |
| AS661795     | huakema            | yunnan         | SWAS                                  | Group3             |
| AS661823     | baiwugongcao       | shaanxi        | Y&H                                   | Group3             |
| AS661853     | pushanba           | shaanxi        | YTS                                   | Group3             |
| AS661867     | xiaohongmai(babao) | qinghai        | Q&T                                   | Group3             |
| AS662061     | youmangyangmai     | gansu          | SWAS                                  | Group3             |
| CS           | Chinese Spring     | sichuan        | SWAS                                  | Group3             |
| AS661094     | dabaimai           | shanxi         | NW                                    | Group4             |
| AS661295     | mangmai            | inner mongolia | NS                                    | Group4             |
| AS661306     | xiaobaisui         | inner mongolia | NS                                    | Group4             |

Table S1. Details information of 272 natural population materials for genome-wide association analysis.

| Accession-ID | Accession-name      | Province  | Chinese wheat plant zone <sup>a</sup> | Group <sup>b</sup> |
|--------------|---------------------|-----------|---------------------------------------|--------------------|
| AS661309     | baichunmai          | gansu     | NWS                                   | Group4             |
| AS661311     | laohongmai          | gansu     | NWS                                   | Group4             |
| AS661320     | xiaomai             | gansu     | NWS                                   | Group4             |
| AS661327     | baidatou            | gansu     | NWS                                   | Group4             |
| AS661329     | shanxihong          | gansu     | NWS                                   | Group4             |
| AS661768     | baiyuxiaomai        | sichuan   | Q&T                                   | Group4             |
| AS661775     | aoshanzaoshuxiaomai | sichuan   | Q&T                                   | Group4             |
| AS661777     | zhaonixiaomai       | sichuan   | SWAS                                  | Group4             |
| AS661778     | ranriwumangmai      | sichuan   | Q&T                                   | Group4             |
| AS661779     | qianqianmai         | guizhou   | SWAS                                  | Group4             |
| AS661791     | guangtoubaikemai    | yunnan    | SWAS                                  | Group4             |
| AS661861     | hongmaomai          | gansu     | NWS                                   | Group4             |
| AS661872     | galaohan            | qinghai   | Q&T                                   | Group4             |
| AS661873     | lanmai              | qinghai   | Q&T                                   | Group4             |
| AS661895     | wangkamai           | tibet     | Q&T                                   | Group4             |
| AS661897     | wumangbaimai        | tibet     | Q&T                                   | Group4             |
| AS661900     | zharenmabu          | tibet     | Q&T                                   | Group4             |
| AS661901     | zharenzhuoma        | tibet     | Q&T                                   | Group4             |
| AS661903     | zhaguogouqumai      | tibet     | Q&T                                   | Group4             |
| AS661904     | zhana               | tibet     | Q&T                                   | Group4             |
| AS661910     | maoyinmai           | tibet     | Q&T                                   | Group4             |
| AS661911     | hangmangmaoyinmai   | tibet     | Q&T                                   | Group4             |
| AS661914     | changmangpeizhuo    | tibet     | Q&T                                   | Group4             |
| AS661915     | renbuchun           | tibet     | Q&T                                   | Group4             |
| AS661916     | wendachangguangmai  | tibet     | Q&T                                   | Group4             |
| AS661934     | jiachashumai        | tibet     | Q&T                                   | Group4             |
| AS661936     | jidingwumangchun    | tibet     | Q&T                                   | Group4             |
| AS661961     | suzhuozhuoma        | tibet     | Q&T                                   | Group4             |
| AS661978     | zedangzaxiaomai     | tibet     | Q&T                                   | Group4             |
| AS662003     | wumangxiaomai       | tibet     | Q&T                                   | Group4             |
| AS662022     | shenggexiaomai      | tibet     | Q&T                                   | Group4             |
| AS662028     | zhaxigangzhuo       | tibet     | Q&T                                   | Group4             |
| AS662033     | jigupizhuo          | tibet     | Q&T                                   | Group4             |
| AS662034     | dadangzhuo          | tibet     | Q&T                                   | Group4             |
| AS662042     | yigongzhuo          | tibet     | Q&T                                   | Group4             |
| AS662049     | tajizhuo            | tibet     | Q&T                                   | Group4             |
| AS662050     | pumanghongmai       | tibet     | Q&T                                   | Group4             |
| AS662052     | tarongzhuo          | tibet     | Q&T                                   | Group4             |
| AS662053     | fanshenzhuo         | tibet     | Q&T                                   | Group4             |
| AS662059     | laobaimai           | gansu     | NWS                                   | Group4             |
| AS662068     | hongtuzi            | ningxia   | NWS                                   | Group4             |
| AS661028     | baimai39F           | hebei     | NW                                    | Mix                |
| AS661067     | xiaohongmang        | hebei     | NW                                    | Mix                |
| AS661117     | louguding           | shangdong | Y&H                                   | Mix                |
| AS661118     | qimai               | shangdong | Y&H                                   | Mix                |
| AS661152     | yejiling            | shangdong | Y&H                                   | Mix                |
| AS661160     | shidaosankemang     | shangdong | Y&H                                   | Mix                |
| AS661183     | dakoumai            | henan     | Y&H                                   | Mix                |
| AS661209     | lingbao925          | henan     | Y&H                                   | Mix                |
| AS661241     | changmangbaike      | shaanxi   | NW                                    | Mix                |
| AS661260     | yangmai             | shaanxi   | NW                                    | Mix                |

Table S1. Details information of 272 natural population materials for genome-wide association analysis.

| Accession-ID | Accession-name     | Province       | Chinese wheat plant zone <sup>a</sup> | Group <sup>b</sup> |
|--------------|--------------------|----------------|---------------------------------------|--------------------|
| AS661369     | qingxinlanmai      | xinjiang       | XJ                                    | Mix                |
| AS661599     | yupi               | sichuan        | SWAS                                  | Mix                |
| AS661665     | yuqiumai           | guizhou        | SWAS                                  | Mix                |
| AS661667     | caoxiepian         | guizhou        | SWAS                                  | Mix                |
| AS661668     | huimai             | guizhou        | SWAS                                  | Mix                |
| AS661694     | erdaomei           | inner mongolia | NS                                    | Mix                |
| AS661724     | baisuizi           | shangdong      | Y&H                                   | Mix                |
| AS661735     | baimai             | hubei          | YTS                                   | Mix                |
| AS661749     | yangmai            | hubei          | YTS                                   | Mix                |
| AS661760     | wugongxu           | hubei          | YTS                                   | Mix                |
| AS661804     | xiaohongmai        | shaanxi        | NW                                    | Mix                |
| AS661855     | deguolan           | shaanxi        | Y&H                                   | Mix                |
| AS661868     | xiaohongmai        | qinghai        | Q&T                                   | Mix                |
| AS661929     | jiachazharenzhuoma | tibet          | Q&T                                   | Mix                |
| AS661945     | quxiajizhuo        | tibet          | Q&T                                   | Mix                |
| AS661976     | bomizamai-5        | tibet          | Q&T                                   | Mix                |
| AS662020     | molengmai          | yunnan         | SWAS                                  | Mix                |

Note: <sup>a</sup>. Geographic distribution of the tested landrace accessions. The ten Chinese agro-ecological zones (CAEZs) includes: NW (Northern Winter Wheat Zone), Y&H (Yellow and Huai River Valleys Facultative Wheat Zone), YTS (Middle and Low Yangtze Valleys Autumn-Sown Spring Wheat Zone), SAS (Southern Autumn-Sown Spring Wheat Zone), SWAS (Southwestern Autumn-Sown Spring Wheat Zone), NES (Northeastern Spring Wheat Zone), NS (Northern Spring Wheat Zone), NWS (Northwestern Spring Wheat Zone), Q&T (Qinghai-Tibetan Plateau Spring-Winter Wheat Zone), and XJ (Xinjiang Winter-Spring Wheat Zone). <sup>b</sup>.

Groups were culculated by the software Structure 2.3.4