A Report to:
Chinese Association of Zoological Gardens (CAZG)
Giant Panda Office, Department of Wildlife Conservation, State Forestry Administration
Giant Panda Conservation Foundation (GPCF)

致：
中国动物园协会 CAZG
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From the
IUCN/SSC Conservation Breeding Specialist Group

由世界自然保护联盟/保护繁育专家组提供

2010 Breeding Strategy Recommendations and Summary of the Status of the Giant Panda Captive Population

2010 年圈养大熊猫繁殖策略建议及种群概况

11-14 November 2009
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Executive Summary
项目执行总结

This is a report on the meeting held 11-14 November 2009 in Chengdu, China to update the analysis of the *ex situ* population of giant pandas and to discuss population goals and propose management strategies and breeding recommendations to achieve those goals. This is the eighth annual set of genetic management recommendations developed for giant pandas.

本文是 2009 年 11 月 11-14 日在中国成都所召开会议的报告。该会议旨在对大熊猫迁地种群所做的分析予以更新，讨论种群目标，并为实现这些目标提出管理策略和繁殖建议。我们已是第 8 次为大熊猫的遗传管理提供年度建议了。

The current *ex situ* population of giant pandas consists of 293 animals (135 males, 158 females) located in 50 institutions worldwide. In 2009 there were 25 births, 1 death and no pandas captured from or released into the wild. Currently 82% of the population is captive born.

目前迁地大熊猫种群的数量维持在 293 只的规模上（雄性 135 只，雌性 158 只），他们在全世界的 50 个不同的大熊猫饲养机构中生活着。在 2009 年期间共计出生 25 只幼仔，其中 1 只个体死亡，没有从野外捕获的大熊猫，尚未有圈养大熊猫放归野外。目前种群的 82%为圈养出生。

The genetic status of the population is currently healthy, with 50 founders represented and another 13 that could be genetically represented if they were to successfully breed. There are only 8 inbred animals in the population. However, the number of breeding options within institutions will become limited, as many of the breeding aged animals within institutions are related. Individuals, or sperm, will need to be transferred among institutions in the near future to avoid pairing highly related individuals.

当前圈养种群的总体遗传状况还算健康，其中包括 50 只建群者遗传表达，如果另外 13 只个体能够繁殖成功的话，其遗传因素也可在现有种群中得到表达。该种群中有 8 只幼仔为近亲繁殖的后代。但是当我们仅局限在某一个保有机构中考虑大熊猫繁殖时，其繁殖的选择机会就变得极为有限，因为其中大部分已达到繁殖年龄的个体都存在一定的亲缘关系；因此，在考虑大熊猫配对时，在各大熊猫保有机构间进行繁殖亲体或精子的交换是非常必要的，这样才能使我们避免在不久的将来不得不使用亲缘关系很高的个体进行配对繁殖。

There are 94 giant pandas in the studbook with unknown or uncertain sires. Because of this, most of the pandas in the living population have at least some uncertainty in their pedigree. The result is that 24% of the gene pool of the *ex situ* population is derived from uncertain ancestry.

大熊猫谱系显示其中有 94 只个体的父本不详。基于这个原因，大部分存活种群中的大熊猫，其谱系都至少有一些不确定性。当前迁地种群的基因库中约有 24%的后代是源自这些血缘不清个体的。

Molecular genetic analyses must continue to be used to confirm the parentage of these cubs before the next set of genetic management recommendations is made. This report contains the list of giant pandas that need to have their paternity verified. A tentative plan is in place to resolve many of these uncertainties within the next year.

在提出下一年度的遗传管理建议之前，我们必须继续使用分子遗传学分析方法对这些父本不清的幼仔进行亲子鉴定。本报告附有需要进行父权鉴定的大熊猫清单。明年内将会制定一个初步计划，来部分解决这些不确定因素。

Population growth has exceeded expectations, averaging 10% annual growth for the past five years, and the global giant panda population has just about reached its target population size of 300 animals. The participants of the 2009 Giant Panda Genetic Management Technical Meeting discussed the purposes and status of the *ex situ* population and proposed a revision of the population goal to the **new goal to maintain a target population of 400-600 giant pandas that retains at least 90% gene diversity of the wild population for 200 years**. A population of this size and genetic composition should be able to provide animals for reintroduction efforts if needed in the future. Greater emphasis will be placed on genetic management and natural reproductive and parental care behaviors. Additional discussions and analyses are needed to evaluate the status and threats of the wild population and how *ex situ* conservation efforts can support *in situ* giant panda conservation, and a workshop to address these issues has been proposed.

过去五年来，种群增长超过了预期，平均达 10%。这样，全球大熊猫的数量几乎已经达到 300 只的目标种群大小。在 2009 年的大熊猫遗传管理会议上，代表们对迁地种群的现状和意义进行了讨论，并提议将新目标修改为：“在 200 年内至少保留 90%野生大熊猫的遗传多样性”的目标种群大小（400-600 只）”。这个规模和基因构成的种群应该能够为未来需要的野外放归提供足够的动物。应更多强调遗传管理、自然繁殖和父母亲自抚养行为上来。需要更多地讨论和分析，来评估野外种群的状况和威胁，以及迁地保护如何能支持就地大熊猫保护。已提议召开研讨会讨论这些问题。

Status of Captive Population
圈养种群的状态

Introduction
简介

This is a report on the meeting held 11-14 November 2009 in Chengdu, China to update the analysis of the *ex situ* population of giant pandas and to discuss population goals and propose management strategies and breeding recommendations to achieve those goals, beginning with the 2010 breeding season. This meeting reviewed the progress made since genetic management of this population began in 2002 and developed a strategy for moving forward based on past successes and current challenges. The meeting was organized by the Chinese Association of Zoological Gardens (CAZG), and facilitated by the IUCN Conservation Breeding Specialist Group (CBSG).

The goals of the workshop were to:

- update the studbook with reports from all participating institutions;
- update the demographic and genetic analyses of the *ex situ* population;
- review the purpose and overall goals for the *ex situ* population; and
- formulate recommendations for breeding and management to promote these goals.

本文是 2009 年 11 月 11-14 日在中国成都所召开会议的报告。该会议旨在对大熊猫迁地种群所做的分析予以更新，讨论种群目标，并为实现这些目标提出管理策略和繁殖建议。此次会议回顾了自 2002 年开始实施的种群遗传管理所取得的进展，并制定了基于过去成功和目前挑战基础上继续推进的策略。本次会议由中国动物园协会 CAZG 主办，并由国际自然保护联盟 IUCN 的保护繁育专家组 CBSG 主持。

会议的目标是：

- 根据各参与机构提供的报告重新修订圈养大熊猫谱系；
- 更新迁地大熊猫种群数量和遗传分析结果；
- 回顾迁地种群的目的和总体目标；以及
- 为达到这些目标制定大熊猫繁殖和管理建议。

Analytical Methods
分析方法

Data were taken from the 12 November 2009 version of the *International Giant Panda Studbook* compiled by Xie Zhong, CAZG, and Jonathan Gipps, Bristol Zoo, using the ISIS Single Population Analysis and Record-Keeping System (SPARKS) v1.56 software program. Data were current through the day of the workshop, as the studbook was updated during the workshop by institutional representatives.

数据来源于中国动物园协会 CAZG 谢钟女士和英国布里斯托尔动物园 Jonathan Gipps 先生编辑的 2009 年 11 月 12 日版国际大熊猫谱系，使用的软件是 ISIS 单种群分析及记录保存系统(SPARKS)1.56 版。所用数据的截止日期为会议当天，因为谱系的更新是会议期间各机构与会代表共同完成的。

Paternity is uncertain for many animals in the studbook. For many of these cases, females were first mated naturally and were then subsequently artificially inseminated. In others, lack of record-keeping in the early studbook years resulted in uncertainty about which males sired which cubs. A molecular analysis conducted in 2001 identified the paternity of many cubs. Further molecular analysis by Shen Fujin (Chengdu Panda Research Base) updated paternity of many of the cubs born between 2002 and 2007. However, many cubs born in 2008 and 2009 continue to have uncertain paternity.

目前谱系数据库中还有许多熊猫的父子关系尚未得到辨认。这些个案大部分都是雌性大熊猫先与雄性大熊猫进行自然交配，然后再对其实施人工授精。另外一些个案是因早期的谱系没有收录这些数据，从而导致无法确认哪些雄性熊猫成功地进行了繁殖。2001 年进行的分子遗传学分析确定了很多幼仔的父本。由沈富军（成都繁育基地）继续开展的分子遗传学分析解决了很多在 2002 年和 2007 年所出生幼仔的父权问题。但是，2008 和 2009 年出生的很多幼仔仍无法确定父权。

Currently there are 94 pandas listed in the studbook with unknown paternity. However, many of these died without leaving offspring, or their offspring failed to reproduce. Only 74 pandas with uncertain sires affect the living gene pool. These are shown in Appendix A. The uncertain paternity of these 74 individuals results in 24% of the living gene pool being unknown.

列入当前谱系的有 94 只父本不清的大熊猫。但其中的大部分已经死亡，也没有留下任何后代或他们的后代未能成功繁殖。因此，只有 74 只父本不清的个体对现有种群基因库能产生影响。具体影响请参看附录 A。由于这 74 只大熊猫的父本不清，导致现有的基因库存在 24%的无法确认的成份。

Molecular analyses are needed to resolve the paternity of these 74 pandas as soon as possible since genetic management recommendations will not be accurate with these unknowns in the pedigree.

我们必须尽快为这 74 只大熊猫进行亲子鉴定。若谱系中未知信息太多，则遗传管理建议将不再准确。日后可以做精确的遗传管理建议。

Assumptions about Paternity
关于父权的假定

Often in captivity female pandas are both naturally mated and artificially inseminated to maximize the probability of conception. However, the molecular analysis performed by David *et al*. in 2001 found that in all cases that were analyzed, the pregnancy resulted from the male who did the natural mating rather than the male contributing sperm for the AI. Therefore, paternity was assigned to the male performing the natural mating for analytical purposes for this meeting. Each breeding institution was consulted regarding other sire identity conflicts for input on paternity assumptions based upon behavior or other factors. In some instances, proven breeders were given a greater probability of siring the offspring. Listed in Appendix A are those individuals in the studbook with unresolved paternities affecting genetic management and corresponding sire assumptions in the analytical database. These assumed paternities were recorded in the database identified as GP09XX and the EXCHEXCL.dbf for export to PM2000.

为最大限度地争取繁殖成功的机会，通常会让圈养种群中雌性大熊猫先与雄性大熊猫进行自然交配，然后再对其实施人工授精。此前，David 等人在 2001 年通过分子遗传学分析技术对大熊猫进行的亲子鉴定结果显示，在全部上述情形中，导致雌性大熊猫受孕的均为自然交配的雄性，而不是为进行人工授精而提供精子的雄性。因此，本次会议将那些做了自然交配的雄性指定为父亲，用于数据分析。。同时我们还与各个机构协商，将行为和其它因素考虑进去，对持有不同意见的父权关系进行评估和论证。经过反复讨论，这些繁殖者是幼崽父亲的可能性就显著提高了。附录 A 中列出了谱系中尚未确定亲子关系的所有个体及在相关分析数据库中的全部假设父本个体。这些假设的父本被收录在命名为 GP09XX 和 EXCHEXCL.dbf 的数据库中，以待输出到 PM2000。

Although sire assumptions are made based on the best available information, they are not verified and thus represent a source of error in calculating gene diversity and genetic relationships among giant pandas. When the results of the 2007 paternity testing for 16 pandas was compared with the sire assumptions used in the 2006 population analysis, there were only 4 instances in which the correct sire was analyzed as being the sole contributor of the paternal parental line. There were 10 instances in which the true sire was used as 50% of the sire in the analysis, and 2 instances in which the true sire was not represented at all in the analysis, meaning that the sire assumptions correctly represented about 56% of the sire genetic lines for these 16 pandas. Sire assumptions were more accurate for 17 pandas resolved by 2009 paternity testing (90% of the sire genetic lines), but there were still errors in the assumptions and therefore in the genetic analysis. Although paternity testing has resulted in true sire determination for many pandas, new births to unconfirmed sires occur each year, with the result that about 24% of the living population gene pool continues to be unknown each year. **It will be important to resolve these and any future uncertain paternities to accurately evaluate the genetic value of individuals, the relationship between mates, and the status of the population as a whole.**

虽然对父亲的假设使用了最为可靠的信息，但并没有确认父权关系。据此来计算遗传多样性和大熊猫之间的遗传关系就会出现差错。将 2006 年种群分析时的假设与 2007 年 16 只大熊猫亲子鉴定的结果相比较：只有 4 例将真父作为惟一的父权贡献者进行了分析；有

10 例将真父视作 50％的父权贡献者；还有 2 例，真父根本就没有用于分析（被遗漏）。这就意味着，准确的父亲假设在这 16 例中的代表性仅为 56％。2009 年的亲子鉴定确定了 17 只熊猫的父亲,使得假设更加准确（父亲遗传系的 90%）。但假设仍然有错误,因此遗传分析也存在错误。虽然亲子鉴定解决了许多大熊猫的父权问题，但每年都有许多没有核实父亲的幼崽出生，导致存活种群基因库中每年都持续有 24％的个体没有确证亲子关系。**确定任一当前和未来圈养大熊猫种群个体间的亲子关系，对于准确的估价每只大熊猫的个体遗传价值、繁殖配对亲本之间的关系以及种群的整体状态都是非常重要的。**

Assumptions about Breeding Population
繁殖群的假设

PM2000 v1.213 software (Pollak, Lacy and Ballou) was used to conduct both demographic and genetic analyses. Demographic characteristics of the population were analyzed for the period from 1 January 1990 to 12 November 2009. Genetic analysis was performed on the global living captive population. It is important to document the methods used in conducting the genetic analyses so that they can be repeated in future years. This year 39 pandas were excluded from the genetic analysis due to old age or chronic poor health and are listed in Table 1. These pandas were excluded because they are not considered to be able to breed in the future and therefore can no longer contribute to the genetic diversity of the captive population. This left 254 pandas in the genetic population analysis, including three males that are considered too old to breed naturally but can sire offspring through artificial insemination (SB 342, 357, and 658). Eleven of the excluded pandas are wild-caught animals that did not produce any offspring. The loss of genetically valuable (underrepresented) pandas from the potential breeding pool decreases the gene diversity of the population.

我们使用 PM2000 1.213 版(由 Pollak, Lacy 和 Ballou 开发的软件)对圈养大熊猫进行种群数量和遗传分析。对 1990 年 1 月 1 日至 2009 年 11 月 12 日期间的圈养大熊猫种群进行了种群数量特征分析，同样对全球现存圈养大熊猫种群也进行了遗传分析。将用于对圈养大熊猫进行遗传分析的方法记录在案是非常重要的，以便今后可以按照记录的方法重复进行类似的分析工作。今年没有对 39 只年老和有慢性病的大熊猫个体进行遗传分析（见表 1）。 这些大熊猫被排除的原因在于它们不能繁殖了，因此不会再对圈养种群有遗传贡献。剩下 254 只个体进行了种群遗传分析，包括 3 只被认定无法自然交配，但仍可采取人工授精的年老雄性熊猫 （谱系号 342, 357, 和 658）。排除在外的 11 只熊猫是野外捕获的，没有产生后代的。 将具有遗传价值（代表性不足）的大熊猫从潜在繁殖群中排除，将降低种群的遗传多样性。

Table 1. The 39 giant pandas excluded from the 2009 genetic analyses.
表一：2009 年未作遗传分析的 39 只大熊猫

ID 谱系号	Age 年龄	Sex 性别	Location 地点	Reason 原因
203	33	F 雌	FUZHOU 福州	Too old 太老
208	31	M 雄	BERLINZOO 柏林	Too old 太老
214	32	F 雌	PANYU 番禺	Too old 太老
230	31	F 雌	ABERDE HK 香港	Too old 太老
231	29	M 雄	SHANGHAI 上海	Too old 太老
247	27	F 雌	DALIAN 大连	Too old 太老
264	29	F 雌	FUZHOU 福州	Too old 太老
278	25	F 雌	CHANGSHA 长沙	Too old 太老
291	24	F 雌	MEXICOCTY 墨西哥	Too old 太老
297	24	F 雌	HANGZHOU 杭州	Too old 太老
308	24	M 雄	YAAN BC 雅安繁殖中心	Too old 太老
314	23	F 雌	HEFEI W 合肥野生动物园	Too old 太老
320	23	F 雌	BEIJING 北京	Too old 太老
312	26	F 雌	SUZHOU 苏州	Too old 太老
329	23	M 雄	YAAN BC 雅安繁殖中心	Too old 太老
332	22	F 雌	MEXICOCTY 墨西哥	Too old 太老
358	25	F 雌	PANYU 番禺	Too old 太老
365	26	F 雌	SHANGHAIW 上海野生动物园	Too old 太老
373	18	F 雌	GUIZHOU W 贵州野生动物园	Poor health 体衰
374	20	F 雌	ZHENGZHOU 郑州	Too old 太老
388	17	F 雌	BAODING 保定	Poor health 体衰
397	26	F 雌	YAAN BC 雅安繁殖中心	Too old 太老
404	16	F 雌	GUILIN	Poor health 体衰
414	19	F 雌	JINAN	Too old 太老
444	21	F 雌	LOUGUANTA 楼观台	Too old 太老
446	22	F 雌	XIAMEN 厦门	Too old 太老
469	11	M 雄	BEIJING 北京	Poor health 体衰
497	13	F 雌	LOUGUANTA 楼观台	Poor health 体衰
498	25	F 雌	FUZHOU 福州	Too old 太老
500	24	F 雌	TAIYUAN	Too old 太老
515	9	M 雄	CHENGDU 成都	Poor health 体衰
553	7	M 雄	LANZHOU 兰州	Poor health 体衰
579	8	M 雄	YAAN BC 雅安繁殖中心	Poor health 体衰
594	22	M 雄	YAAN BC 雅安繁殖中心	Too old 太老
597	22	F 雌	NANCHANG 南昌	Too old 太老
621	20	M 雄	YAAN BC 雅安繁殖中心	Too old 太老
652	3	F 雌	BEIJING 北京	Poor health 体衰
659	18	M 雄	TAIYUAN 太原	Too old 太老
695	22	M 雄	FUZHOU 福州	Too old 太老

Demographic Summary
种群数量分析概要

The current *ex situ* population of giant pandas consists of 293 animals (135 males, 158 females) located in 50 institutions worldwide. In 2009 there were 25 births, 1 death, and no pandas captured from or released into the wild.

目前迁地大熊猫种群的数量维持在 293 只的规模上（雄性 135 只，雌性 158 只），他们在全世界的 50 个不同的大熊猫饲养机构中生活着。2009 年出生 25 只幼仔，有 1 只死亡，没有从野外捕获，也没有大熊猫放归到野外。

From 1990 until 2004 the population grew about 4% annually (Figure 1). However, reproduction over the last five years has been outstanding, resulting in an annual population increase of 9-15% for 2005 to 2009. The age structure of the living population is healthy and indicative of a population that would be expected to continue to grow (Figure 2). A greater proportion of adult pandas have reproduced, especially females (from 41% in 2002 to 64% in 2009), which contributes positively to growth as well as effective population size (Ne) (Ne/N increased from 0.22 in 2002 to 0.26 by 2009).

从 1990 到 2004 年，国内圈养种群的增长率为年均 4%（见图 1）。但是过去 5 年的增长格外突出，从 2005 和 2009，年均增长为 9－15%。现有种群的年龄结构很健康，预计在未来会继续增长（见图 2）。更大比例的成年熊猫参与了繁殖，尤其是雌性（从 2002 年的 41%到 2009 年的 64%），对增长和有效种群大小（Ne）都有积极贡献 （Ne/N，遗传管理有效性指数，即有效种群大小与实际大小之比，从 2002 年的 0.22 增长到 2009 年的 0.26）。

The increased reproduction over the last 19 years has also resulted in a shift in the proportion of animals in the population that are captive-born. Before 1996, the majority of the population was wild-caught. However, since 1997 the majority has been captive-born, with that percent currently at 82%.

过去 19 年圈养种群数量的增长也改变了人工条件下出生熊猫的比例。1996 年以前，大部分圈养种群是从野外捕获的。但是从 1997 年之后，大部分圈养大熊猫为人工条件下出生，占种群总数的 82%。

Females are generally reproductive from 5-20 years of age, while male fertility can continue into the 20s. Mean generation time for the population is 10.5 years. Litters consist of 1-2 cubs with almost equal frequency (two litters of triplets have been observed), producing a mean litter size of 1.5 cubs. Average cub survival to 30 days from 1990 to present has been about 80%. Cub survival has improved in recent years due in part to improved rearing techniques for twins and rejected cubs and has averaged 85% since 1998 (Figure 3). About 50% of males survive to age 13-14, 25% survive to age 20, and only about 10% survive to age 28; female survivorship is

slightly better, with about 50% reaching age 16, 25% surviving to age 26, and 10% surviving to age 32. These values include wild-caught pandas whose ages are estimated.

雌性大熊猫的繁殖年龄通常在 5-20 岁间，而雄性大熊猫的繁殖能力可以持续到 20 岁之后。 圈养大熊猫的平均代间隔为 10.5 年。每胎产 1 或 2 只幼仔的概率几乎相等（记录到两次每胎产 3 只幼仔的）。圈养大熊猫的平均胎仔数是 1.5 只。从 1990 年到现在幼仔存活到 30 天的成活率大约是 80%。幼仔的存活率近些年有了很大增长，原因是对双胞胎及双胞胎中被雌性大熊猫抛弃幼仔的人工饲养技术得到了提高，自 1998 年以来其人工饲养存活率已达 85% （见图 3）。雄性大熊猫活到 13-14 岁的成活率大约为 50%，25%的雄性活到 20 岁，只有 10%的雄性或倒 28 岁。而雌性的存活率要稍微好些，50%的雌性活到 16 岁，25%的雌性活到 26 岁， 10%的个体活到 32 岁。这些数值也包括了对野外捕获个体的年龄所做的估算。

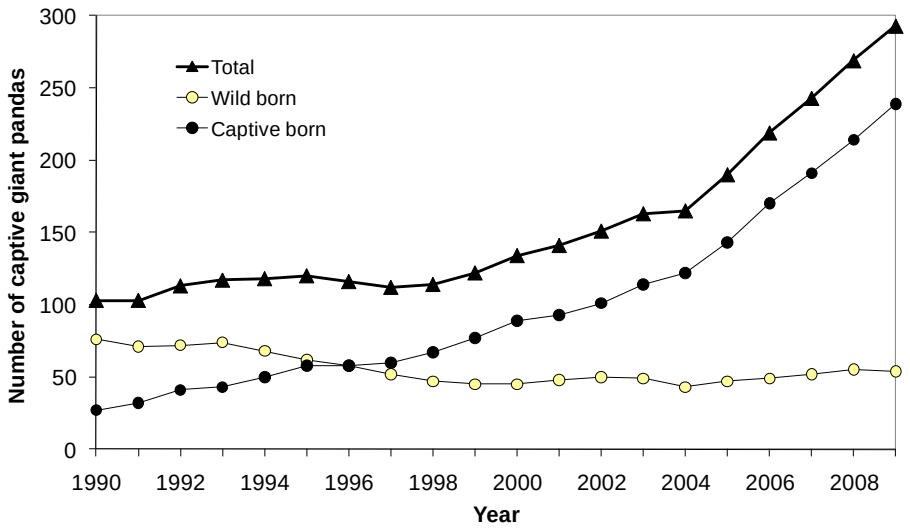

Figure 1. Growth of the captive giant panda population.
图 1：圈养大熊猫种群的增长情况

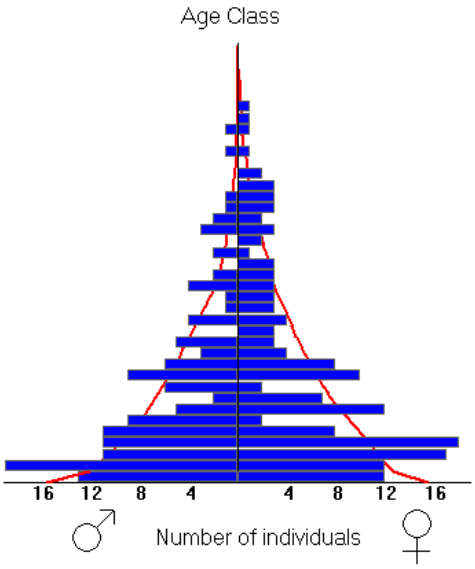

Figure 2. Age and sex structure of the 2009 population.
图 2.　2009 年种群的年龄性别结构。

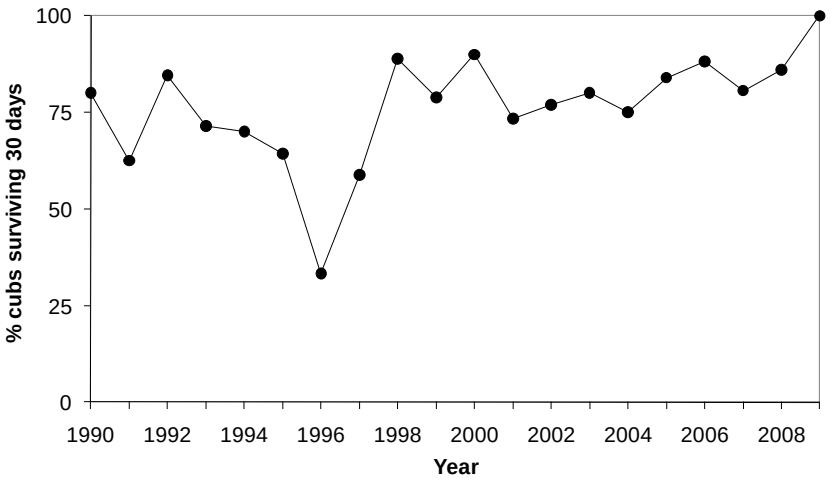

Figure 3. Cub survival (% surviving to 30 days of age) over time.
图 3. 幼仔存活情况（存活超过 30 天的比率）

Genetic Summary
遗传概况

The *ex situ* giant panda population has descended from 50 wild-caught founders (founders are defined as animals caught in the wild that have successfully produced offspring or descendants in the current population). There are an additional 13 wild-caught pandas that have yet to produce living offspring but have not been excluded due to age or poor health (these are potential founders). The population theoretically contains 97.1% of the genetic diversity of the wild population. This level of genetic diversity has a founder genome equivalent (*fge*) of 17.4, which means that the population has the same level of genetic diversity as a population newly established with 17 unrelated founders. The genetic contribution of founders is highly skewed, with 29% of the gene pool derived from only 4 founders (Figure 4). The level of genetic diversity in the population could be increased to 99% if the population was ideally managed and the genes from the additional 13 founders fully incorporated into the population. The population would then have a founder genome equivalent of 51.9 (Table 2). Managing the population to minimize average kinship has been shown to be the optimal method for retaining genetic diversity in the population. Managing by mean kinship will automatically identify descendents from the under-represented founders as priority breeders.

大熊猫迁地种群主要源自 50 只野外捕获的大熊猫建群者（建群者指从野外捕获并成功在现有种群中繁殖出后代的个体）。还有 13 只野外捕获的熊猫尚未繁殖出成活的后代，但因为年龄和身体问题没有被排除在外（这些个体是潜在的建群者）。理论上讲，迁地种群的遗传多样性占野生种群遗传多样性的 97.1%。该水平的遗传多样性所代表的建群者染色体等价数（fge）为 17.4。也就是说，该种群的遗传多样性水平与一个由 17 只互无血缘关系的个体建成的新种群一致。建群者的遗传贡献高度扭曲，基因库的 29%仅仅衍生自 4 只建群者（见图 4）。如果该种群的管理处于理想状态之下且其他 13 只潜在建群者的基因能被全部融入种群的话，则该种群的遗传多样性水平可提升至 99%。那么该种群的建群者染色体等价数（fge）将变更为 51.9 （见表二）。通过管理使得种群的平均血缘关系最小化业已被证实属于保持种群遗传多样性的最佳方法。依据平均血缘关系进行管理将自动把那些后代数量尚少，遗传价值尚未得到完全体现的建群者的后代推荐为优先的繁殖者。

Table 2. Genetic summary of the 2009 *ex situ* population.
2009 年迁地种群遗传学概况

# Founders 建群者	50
# Potential additional founders 潜在新增建群者	13
Proportion genetic diversity retained 保持的遗传多样性部分	0.9712
Potential proportion of genetic diversity retained 潜在保持遗传多样性的部分	0.9904
Founder genome equivalents (*fge*) 建群者染色体值	17.35
Potential *fge* 潜在的建群者染色体值	51.85
Average inbreeding 平均近亲交配率	0.002

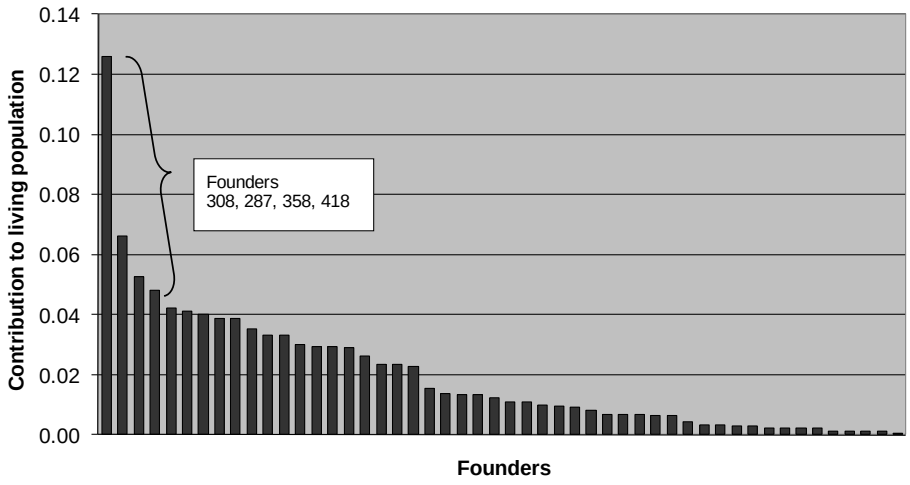

Figure 4. Genetic contribution of the 50 founders to the *ex situ* population gene pool. Each bar shows the contribution of a single founder. About 29% of the gene pool derives from only four founders (the left-most founders: 308, 287, 358 and 418).

图 4. 44 只建群者对迁地种群基因库的遗传贡献。每个棒表示单只建群者的贡献。29%的基因库仅仅衍生自 4 只建群者（最左边的建群者：308、287, 358 和 418 号）。

Current inbreeding levels in the population are low, with only 8 inbred animals (under the parentage assumed for this analysis). While the current population is genetically healthy, pandas within institutions are closely related and it is becoming increasingly more difficult to identify non-related pairings within institutions. Inbreeding will increase as captive breeding increases and the influx of new founders from the wild remains proportionally low. This will be especially true for pairings within institutions, making the transfer of individuals among institutions for breeding more important in the future as a way to minimize inbreeding and the loss of gene diversity. In the near future, giant pandas, or their sperm, will need to be transferred among institutions to increase the number of genetically favorable breeding options in the primary breeding centers.

现有种群的近亲繁殖率很低，只有 8 只（在此分析假设的亲子关系条件下）。随着圈养种群繁殖的增长和野外捕获个体的相对减少，近亲繁殖的可能性将增加。因此未来在机构间进行熊猫交换就显得非常重要，以降低近亲繁殖的几率，减少遗传多样性损失。在未来的几年里，主要圈养机构间应加强熊猫和精液交换，以增加有利于遗传多样性的繁殖机会。

Trade Offs Between Population Growth and Genetic Management
种群增长与遗传管理间的取舍

The current population goals for the *ex situ* giant panda population include both demographic and genetic goals: to expand the population to the desired population size (demographic goal)

and to maintain at least 90% gene diversity in the population for 100 years (genetic goal). These two primary objectives (population growth and genetic management) do not always support each other and can be contradictory. Extreme focus on population growth (ignoring genetic management) might entail using only one or a very few highly successful males to accomplish all of the breedings during a given year. This might result in a higher number of cubs produced, hence a larger population size, but would also result in all or most of the offspring being related to each other. As a consequence, as is often the case, future inbreeding would result in an unhealthy population with high mortality rates and low reproductive rates. This strategy would achieve a large, but genetically unhealthy, population.

目前迁地大熊猫种群目标包括数量和遗传两个方面：将种群扩大到理想大小（数量目标），以及在 100 年内维持 90%的遗传多样性（遗传目标）。在 2002 年的第一届大熊猫遗传管理会议上，确立了迁地大熊猫的种群管理目标：包括“将种群数增加到 300 只（25 年以内）”的种群数量目标和“在 100 年内维持种群 90％遗传多样性”的遗传目标。这两个目标（种群增长与遗传管理）并不总是一致的，甚至相互矛盾。极端关注种群增长而忽视遗传管理将造成一段时间内某个或某几个雄性个体繁殖的成功，可能产生很高数量的幼仔，使得种群得以扩大，但却也可能造成所有或者大部分幼仔间有血缘关系。通常产生的结果就是，未来的近亲繁殖导致种群不健康，死亡率提高，繁殖率下降。这种做法将造成基因不健康的大种群。

On the other hand, an extreme focus on genetic management (ignoring demographics) might entail trying to breed only the most underrepresented males and females. Certainly the number of females reproducing and number of cubs produced would decline. Reproductive rates might be too low to sustain the population. This strategy would result in a genetically healthy, but small or declining population.

反之，如果过分关注遗传而忽视数量，只让最具遗传代表性的个体参与繁殖，那么能生育的雌体及产生的幼仔数量将减少，生育率过低而无法维持种群。这种做法将产生遗传健康、但数量不断减少的小种群。

Population management then becomes a balance between demographic management and genetic management: achieving sufficient (but not maximum) reproduction among a genetically good (but maybe not ideal) set of individuals. This often means compromising both population growth and genetic management. There will be some loss of reproduction when inexperienced males and female are paired and some genetic compromises when breeding are set up among some genetically over-represented pairs to ensure enough reproduction occurs. This is a challenge that all managed populations face, not only giant pandas.

种群管理就是要在数量管理和遗传管理间找到平衡，即让遗传健康（也许并不理想）的个体进行充分但不过度的繁殖，协调种群增长和遗传管理的矛盾。这样当无经验的雌雄个体配对时，可能会造成繁殖上的损失；或者为了确保繁殖数量，让一些遗传代表性过度的个体配对，造成遗传上的损失。不光是大熊猫，各圈养种群均面临此挑战。

Overview of Past Breeding Strategy and Results
以前的繁殖策略和结果概述

To balance genetic management and population growth for giant pandas, the decision was made in past years to attempt to breed almost all potentially reproductive females (to maximize growth) while using genetically valuable, unrelated males as potential sires (genetic management) as much as possible. Specific breeding recommendations are made each year as part of this genetic management strategy that suggest which male or males should be used for mating (either by natural mating or AI) with each breeding female. Breeding pairs with MSI score ≤ 4 are highly preferred to prevent significant genetic loss or inbreeding (see Appendix C for further explanation). Such breeding recommendations were made at the Giant Panda Technical Meeting for the 2003, 2004, 2005 and 2007 breeding seasons. Detailed individual and pair information also is provided each year, which can be used as a basis for selecting breeding pairs in the absence of specific breeding recommendations made during the technical meeting or to identify alternative mates if necessary. The results of the past seven breeding seasons, in terms of litter production and the genetic value of the breeding pairs, are summarized in Table 3. In instances of uncertain paternity, all potential sires were considered as contributing proportionately to those litters.

为了在繁殖和遗传管理间取得平衡，我们在过去几年力图使所有有潜在生育能力的雌性参与实现种群的增长（增长最大化），同时使所有具有非亲缘关系而有遗传价值的雄性尽可能多地参与繁殖（遗传管理）。作为遗传管理策略的一部分，无论是自然交配还是人工授精，我们每年都对哪个或哪几个雄性应该与哪个育龄雌性交配做出了建议。MSI 值小于等于 4 的配对为最佳，以防止基因损失或近亲交配(详见附录 C)。在 2003，2004，2005, 2007 繁殖季节我们均在大熊猫技术会议上做出了类似的繁殖建议。每年我们都提供个体和配对的详细信息，可在会议上制定的特定繁殖建议缺失的情况下，用作选择繁殖配对的基础，或必要的话来确定替代的配对。而过去七个繁殖季的结果，包括产仔数量和繁殖配对的遗传价值，均列在表三中。在父亲不确定的情况下，所有潜在的父亲都被看作是均等的贡献者。

Figure 5 shows the proportion of litters each year that were produced by breeding pairs with MSI scores of 1-3 (genetically beneficial matings), MSI = 4 (slight loss of genetic variation but acceptable for population growth), and non-recommended pairs (MSI > 4). The proportion of good genetic pairings (MSI = 1-3) has increased since 2005. However, over one-third of all litters still are produced by pairs with MSI scores higher than recommended (5, 6 or --). These litters contribute to demographic growth but at the expense of long-term genetic health and management. As the giant panda population approaches its target population size, there will be less need for population growth – fewer litters will be needed, and more emphasis can be placed on breeding pairs with low MSI scores to promote retention of gene diversity in the population.

图 5 所示为每年的繁殖配对中， MSI（交配适宜性指数）处于 1-3 之间（通常是有益的交配），MSI 值为 4（少量基因变异损失，但对种群增长可接受）， 以及 MSI 大于 4（不推荐配对）的配对所产生后代数量的比例。从 2005 年起，MSI 值处于 1-3 之间的好的遗传配对比例有所增加。但是，仍然有 1/3 的后代是由 MSI 指数高于推荐值（5，6 或更高）

的配对产生的。这些后代对数量增长有所贡献，但却是在牺牲长期遗传健康和管理的代价下取得的。随着大熊猫种群数量达到目标规模，对数量的增长需求较少，因为需要的个体数量减少，应更多强调对低 MSI 指数的配对繁殖上，以保留种群的遗传多样性。

Efforts to breed unrepresented wild-caught individuals have increased the number of founders from 40 to 50, which has introduced new genetic lines into the pedigree. Figure 6 shows the relative genetic contribution of each founder to the living population in 2002 and in 2009. Gene diversity increases as more founders are added and as the contributions among founders become more equal. Successful reproduction by the 13 potential founders (wild caught pandas that have not yet reproduced) would be especially useful in increasing gene diversity.

选择从野外捕获的、在种群中没有代表性的个体进行繁殖使得建群者数量从 40 增加到 50，为谱系增加了新的血统。图 6 显示的是 2002 和 2009 年每个建群者对种群的基因贡献。随着建群者数量增加，及建群者之间贡献越来越均等，遗传多样性得以增加。 13 个潜在健群者（野外捕获但未繁殖）的成功繁殖将对遗传多样性有特别的好处。

Table 3. Results of 2003-2009 giant panda breeding seasons.
表三. 2003-2009 大熊猫繁殖成果

	2003	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Demographic Management 数量管理							
Breeding recommendations made 繁殖建议	40	42	57	0	30*	56	0
Litters produced 产仔数量	14	10	17	20	19	23	20
Genetic Management 遗传管理							
% litters from pairs with: 配对产生后代的百分比：							
MSI = 1 – 3 (genetic benefit) MSI= 1-3， 遗传有益	38%	25%	21%	30%	34%	35%	43%
MSI = 4 (slight genetic loss) MSI=4，少量基因损失	15%	40%	35%	46%	16%	32%	21%
MSI > 4 (substantial genetic loss) MSI> 4 (大量基因损失)	47%	35%	44%	24%	50%	33%	36%

* excluding SFA (breeding recommendations for SFA not made at the technical meeting)
* 不包括国家林业局 （在会议上，国家林业局未提供繁殖建议）

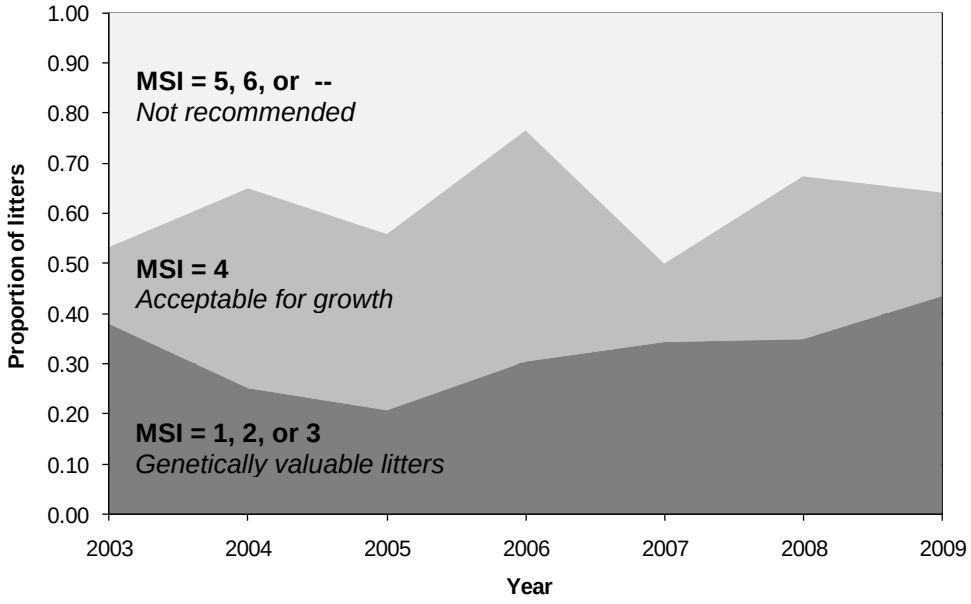

Figure 5. Proportion of litters produced by breeding pairs with various MSI scores each year from 2003 to 2009.

图 5：2003-2009 年不同 MSI 值配对每年产生后代的比例

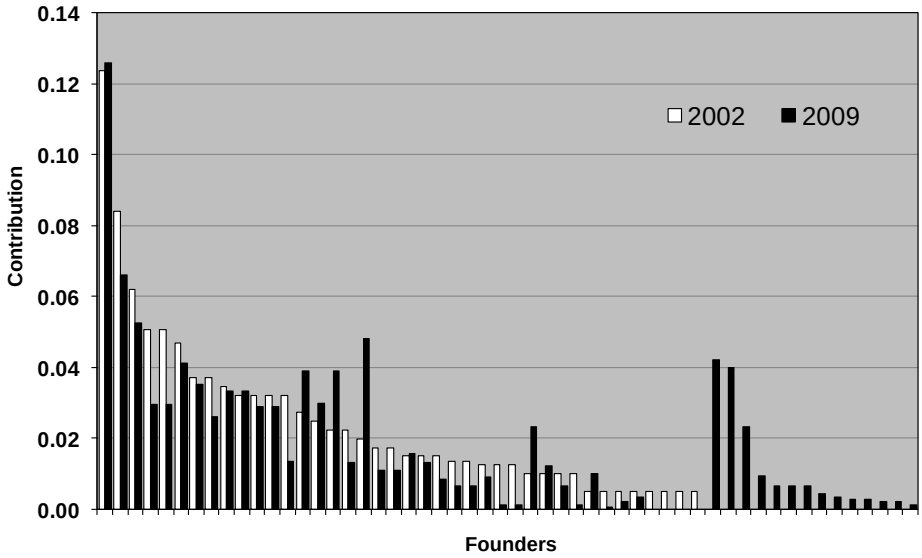

Figure 6. Relative contribution of each founder to the living giant panda population in 2002 and in 2009.

图 6. 2002 和 2009 年每个建群者对现有种群的相对贡献

2009 Giant Panda Population Management Discussion and Recommendations
2009 大熊猫种群管理讨论和建议

Participants at the 2009 Giant Panda Technical Meeting reviewed the status of the captive giant panda population and progress made with the management of this population since establishment of the Giant Panda Breeding Technical Committee at the Genetic Management for Giant Pandas Ex Situ workshop in January 2002. The technical meeting participants reaffirmed the giant panda ex situ conservation goal as:

The maintenance of a sustainable *ex situ* giant panda population that is genetically and demographically viable and can provide animals for release to support the *in situ* population.

参加 2009 技术会议的代表评估了大熊猫种群的现状，以及自 2002 年 1 月在大熊猫迁地遗传管理会议上成立大熊猫繁殖技术委员会取得的进展。与会代表重申了大熊猫迁地保护的目标是：

维持在遗传和数量上有活力的可持续迁地大熊猫种群，使其能为野外放归提供个体，支持就地种群保护。

Quantitative Population Goals
量化种群目标

In 2002 the Technical Committee reviewed the demographic and genetic requirements for a healthy, sustainable *ex situ* population that could potentially serve as a source population for reintroduction, and adopted the common captive breeding goal to maintain an *ex situ* population that is capable of maintaining 90% of the wild population's genetic diversity for 100 years. Computer calculations based on the species' biology, pedigree and an estimated degree of genetic management suggest that a population of 300 giant pandas is needed to achieve this genetic goal.

在 2002 年技术年会上，回顾了为野外放归维持健康、可持续迁地种群所需的数量和遗传要求，制定了圈养种群繁殖的目标，即在 100 年内，保留迁地种群拥有 90%的野外遗传多样性。基于物种生物学、谱系、预计水平的遗传管理信息，由电脑计算得出的建议是，达到该遗传目标需要 300 只大熊猫。

In 2002 there were 152 giant pandas in the global *ex situ* population. Projected annual population growth was 3%, suggesting that the target population size of 300 pandas would be reached within 25 years. Concerted collaborative efforts in population growth and improved husbandry and management, however, have led to significantly higher growth rates, approaching 10% annual growth (Figure 7). Achievement of the target population size means that the giant panda *ex situ* population is leaving the rapid growth phase of captive management and entering the

maintenance phase, in which greater emphasis is placed on genetic management rather than population growth (Figure 8).

2002 年全球迁地熊猫数量为 152 只。制定的年度种群增长率为 3%，这样 300 只的目标将在 25 年内达到。但是由于大家的精诚合作，以及兽医和管理的改进，使得种群增长率远远高于预期，达到了 10% （见图 7）。在种群大小上取得的成就说明，大熊猫迁地种群已经超越了快速增长的圈养管理阶段，进入了保持阶段。应更多强调遗传管理，而不是种群增长（见图 8）。

By 2007, the global population had reached 243 pandas in just five years. In response to this rapid growth, the participants at the 2007 Technical Meeting reviewed the current and projected status of the population and considered possible revision of the population goals. Population modeling using PM2000 explored options for revising the target population size, changing the genetic goal, extending the program length, and altering the intensity of genetic management of the population. These analyses did not include the risk of stochastic events such as infectious disease outbreaks or other catastrophes, which might lead to population decline and more rapid loss of gene diversity.

到 2007 年为止，5 年内全球大熊猫圈养种群数量就达到了 243 只。基于此快速增长的情况，2007 年的技术会议回顾了当时和未来预期的种群情况，考虑修改种群管理目标。使用 PM2000 模板探讨了各种可能，如修改目标种群大小，改变遗传目标，延长项目时限，更改遗传管理的强度。这些分析没有包括可能的意外事件，如传染病发或其它灾害，这些都可能导致种群减少和遗传多样性的快速丧失。

These analyses suggested that retaining substantially higher levels of gene diversity (> 90%) for 100 years, or retaining 90% gene diversity for 200 years, under the current level of genetic management would require a significantly larger target population size (500+ pandas). Increased effort in genetic management was shown to be effective in slowing the loss of gene diversity (Figure 9). These results demonstrated that genetic management is the most sensitive and effective method of maintaining a viable *ex situ* capable of supporting a wild panda population.

这些分析表明，在当前的遗传管理水平下，在 100 年内保留高度的遗传多样性（大于 90%），或 200 年内保留 90% 遗传多样性，都需要更大的目标种群大小（多于 500 只）。遗传管理的加强已导致了遗传多样性丧失的减缓（图 9 所示）。这些结果证明，遗传管理是维持有活力迁地种群，以支持野外大熊猫种群的最敏感和有效的手段。

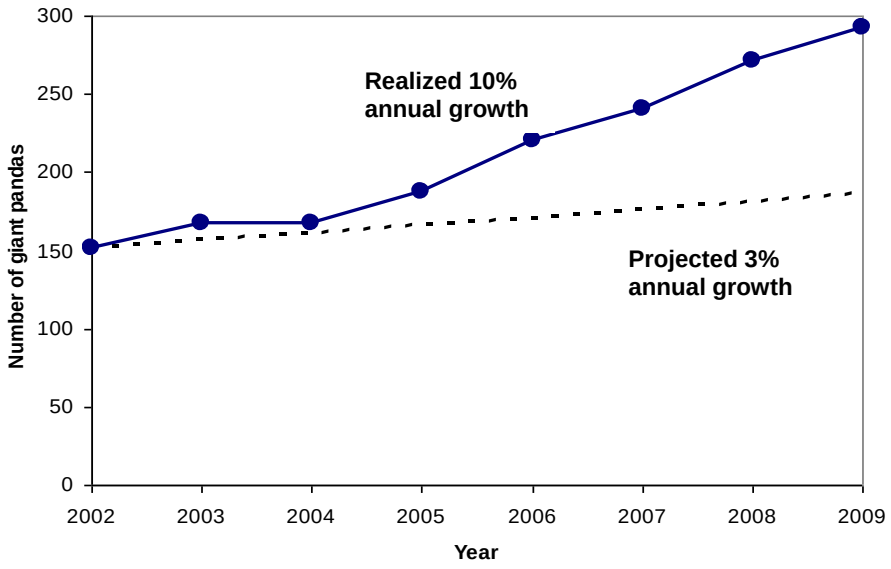

Figure 7. Projected (dashed line) and actual (solid line) growth of the *ex situ* giant panda population from 2002 to 2009.
图 7：2002-2009 年迁地大熊猫种群预期（虚线）和实际（实线）增长率

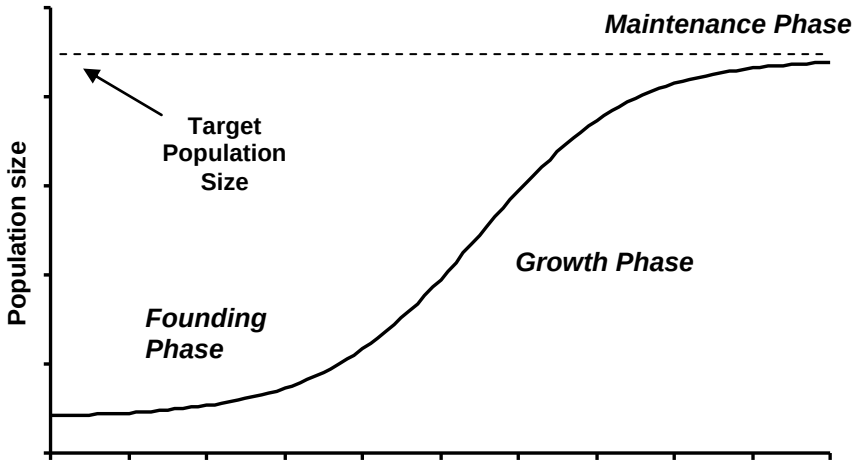

Figure 8. Stages of development of a managed captive population.
图 8：圈养种群管理的发展阶段

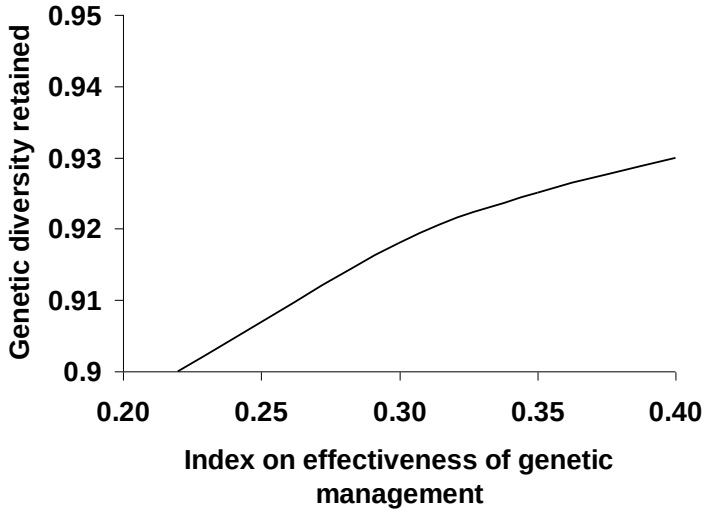

Figure 9. The relationship of gene diversity retained and the level of genetic management for a population of 300 giant pandas. The index of genetic management effectiveness is the ratio of the population's effective size to its actual size (Ne/N), and has increased from 22% in 2002 to 26% in 2009. Increasing the effectiveness of genetic management can substantially increase the retention of genetic diversity.

图 9. 保留遗传多样性与 300 只大熊猫遗传管理水平的关系。遗传管理有效性指数是种群有效大小与实际大小之间的比值（Ne/N），已从 2002 年的 22%增加到 2009 年的 26%。遗传管理有效性增加，则遗传多样性保留程度就会大大增加。

2009 Population Goals and Breeding Strategy

2009 种群目标和繁殖策略

Given that the giant panda *ex situ* population has essentially reached its target population size (n=293), a plenary discussion was held among the 2009 Technical Meeting participants to revisit the population goals and population management strategy to be implemented during this new phase of *ex situ* population development. The following topics were discussed and recommendations made during this meeting.

因为迁地大熊猫种群数量已基本达到目标规模（n= 293）, 在 2009 年技术会议上开展了全体与会代表讨论，重新检视在新的迁地种群发展阶段下的种群目标和管理策略。会上讨论了如下议题，并提出了建议。

1. Purposes of the *Ex Situ* Population:

The *ex situ* giant panda population must be self-sustaining (not requiring periodic addition of new wild-caught founders) so that its maintenance does not cause any pressure on the wild panda population. Many purposes or functions were identified for the *ex situ* population, including:

- Source of pandas for reintroduction needs
- Insurance population against decline or loss of the wild population
- Research opportunities
- Resource for developing techniques in captivity and overseas that can support wild panda conservation in China
- Economic and political benefits (source of funds) to support wild population conservation and local economic development
- Ambassadors for conservation
- Resource for public education as well as more active learning types of public awareness promoting the understanding of pandas and their conservation needs
- Opportunity for people to view pandas without disturbing the wild population / habitat

1．迁地种群的目的：

迁地大熊猫保护必须是自我可持续的（不需要定期从野外捕获新个体），因此它的维持不能对野外大熊猫种群造成任何压力。迁地种群的目的和作用包括如下几条：

- 为野外放归提供资源
- 是野外种群减少或损失的保险群体
- 科研
- 用于开发圈养技术和海外合作，支持中国的野外种群保护
- 经济和政治上获益，资金支持用于野外保护和当地经济发展
- 保护大使
- 公众教育的资源，积极的教育方式提高公众意识，增加对熊猫和保护需求的理解
- 使人们观察到熊猫，且不打扰其野外种群和栖息地

2. Quantitative Population Goals:

The genetic goal is to maintain a genetically healthy (self-sustaining) *ex situ* population, with a similar genetic composition as the wild population, so that it can serve effectively as a genetic reservoir and source population for reintroduction or release. The Technical Meeting participants recommended revising the current goal of maintaining 90% gene diversity for 100 years to a **new goal to maintain 90% gene diversity for 200 years**. Major threats to the wild panda include habitat destruction and the potential negative impacts of climate change – the degree of these threats and their associated timelines are unknown. Also unknown is the extent to which habitat restoration can and will occur. Because of these uncertainties, it was believed that a longer timeline (200 years) be adopted for the *ex situ* population. This new genetic goal requires the management of a **population of about 500 (400-600) giant pandas** given the gene diversity of the current population and the current level of genetic management. A population of about 500 pandas would also be sufficient to meet the other population goals listed above, including the ability to provide a sufficient number of pandas for reintroduction.

2．量化种群目标
遗传目标是保留遗传健康(自我可持续)的迁地种群，与野外种群的遗传构成相似，因此可有效地作为野外放归的基因库。与会代表建议修改目前的 100 年 90%遗传多样性的目标，**新目标为 200 年保留 90%遗传多样性**。对野外熊猫的主要威胁有，栖息地丧失和气候变化带来的负面影响。这些威胁的程度和相关时间表未知。另外栖息地能否及会否恢复也未知。因为以上这些不确定因素，大家相信迁地种群因该采用更长的时间期限（200 年）。基于目前的种群以及遗传管理水平，达到这个新的遗传目标需要对 500 只（400 到 600）的种群进行管理。500 只规模的种群足够实现以上列出的目标，如提供足够数量的个体进行野外放归。

It was recognized that the possibility of two subspecies of giant panda could have significant implications for the *ex situ* program and its achievable goals. This issue needs further discussion.

会议意识到，大熊猫存在两个亚种的可能性将对迁地项目和目标造成重大影响。需要进一步讨论。

3. Breeding Strategy:
Since 2002 there has been a focus on population growth, with a general strategy of attempting to breed all healthy adult females to maximize growth. For institutions with multiple available males or sperm samples, it was recommended to choose males as mates that result in MSI scores of 1 to 4. Although breeding pairs with MSI = 4 are slightly detrimental to the genetic status of the population, this compromise between growth and genetic management was viewed as reasonable during the rapid growth phase of the *ex situ* population. Pairings with MSI > 4 were discouraged unless no other alternative was possible, because these pairings are genetically harmful to the population. This strategy promoted rapid population growth while applying some level of genetic management through the selection of males.

3．繁殖策略
自 2002 年起工作的重点集中在种群增长上，总策略是试图让所有健康的雌性成体都参与繁殖，以达到最大的增长。对于有多个雄性或精液的机构，建议选择 MSI 值 1-4 的进行配对。尽管 MSI 值 4 对遗传多样性有轻微的损害。在快速增长阶段，这种增长与遗传管理间的妥协被认为是有道理的。不鼓励 MSI 大于 4 的配对，除非没有其它选择，因为这种配对对遗传多样性是有害的。此策略导致了种群数量的快速增长，在选择雄性的过程中也进行了一定程度的遗传管理。

While there is a need to continue to grow the population toward the new larger target population size, rapid growth is no longer critical or perhaps even practical. Strong population growth is not needed immediately for either demographic or genetic reasons, and in fact, the breeding of many young animals can reduce generation time and increase the loss of gene diversity. Growth is also not necessary to produce extra pandas for immediate release. To some extent, growth rate may be a practical issue in terms of facility capacity rather than a biological issue at this time.

为达到新目标也需要一定的种群增长，但是快速增长率已经不再重要甚至可行。强大的种群增长在数量或遗传上都不再需要，实际上年轻动物的繁殖会减少世代更替时间，增加遗传多样性的损失。也没有需要保持高增长来产生额外的后代用于放归。某种程度上，现在增长率可能不是生物上的问题，而更多是实际问题，如机构能力和空间。

It was agreed that greater emphasis now should be placed on genetic management and fostering natural behaviors. This will promote a better chance of success if pandas are used for reintroduction efforts in the future. The following specific recommendations were made:

与会者同意，现在应更加强调应该放到遗传管理和培养自然行为上。这将加大未来的野外放归的成功机率。具体建议如下：

i. Priority should be given to breeding pairs with MSI = 1 to 3, especially for those institutions with more than two pandas and with pairing choices. This will improve gene diversity, reduce inbreeding, and possibly slow the growth of the population.

ii. There is no need to attempt to breed all adult females; instead, breeding efforts should concentrate on genetically valuable females. The relative genetic value of individual giant pandas can be determined from the mean kinship list (Appendix B), which lists males (left column) and females (right column) from the most genetically valuable at the top to the least valuable at the bottom of the list. Concentrating breeding on the most genetically valuable animals (under-represented genetic lines) will improve gene diversity and slow growth.

iii. Efforts should be made to breed any wild-caught pandas that have not produced surviving offspring.

iv. Place greater emphasis on natural mating and rely less on artificial insemination (AI), which will promote natural reproductive behaviors necessary for successful reintroduction and possible slow growth.

v. Place greater emphasis on leaving panda cubs with their mothers for nurturing and behavioral experience, which will increase the chance of success for reintroduction by promoting necessary parental care behaviors.

i. 应当优先让 MSI 值 1 到 3 的配对进行繁殖，尤其是那些有超过两只熊猫个体和有多个配对选择的机构。这将改进遗传多样性，减少近亲交配，可能也将减缓种群增长。

ii. 没必要让所有雌性都参与繁殖，应侧重于有遗传价值的雌性。个体的遗传价值能从附录 B，平均亲缘关系值排序表中确定。该附录根据遗传价值高到低，从上（最高）到下(最低) 列出了雄性（左栏）和雌性（右栏）。侧重于遗传多样性价值高的动物（不具代表性的基因系）进行繁殖，将改进遗传多样性，减缓增长率。

iii. 应对所有野外捕获但没有繁殖存活后代的个体进行繁殖。

iv. 更多强调自然交配，减少对人工授精的依赖。这对野外放归培养自然繁殖行为非常必要，也可能减缓增长。

v. 更多强调熊猫幼仔与母亲的哺育和行为，这将培养必要的育幼行为，增加野外放归的成功机率，也可能减缓增长。

4. Challenges:

The participants recognized several challenges to meeting the above goals:

- Taxonomic uncertainty regarding one vs two subspecies, and the implications for *ex situ* management
- Paternity uncertainty (unknown sires in the pedigree)
- Incomplete compliance with the recommendations
- Natural disasters and their impact on both the *ex situ* and *in situ* populations (e.g., earthquake, infectious disease, climate change, cyclic bamboo blooming)
- Status and threats to the wild population are unknown, and therefore the need for reintroduction is unknown; this information needs to be assessed.
- Public perception that funds are not used valuably; we need to demonstrate this.

4．挑战

参会者意识到达到以上目标存在以下挑战：

- 分类学上的不确定性，即大熊猫是一个还是两个亚种，对迁地管理的相关影响。
- 父权不确定性（谱系中未知的）
- 对谱系配对建议不完整的认同
- 自然灾害及其对迁地、就地种群的影响（如，地震、传染病、气候变化、周期性竹子开花）
- 野外种群的现状和威胁未明，因此野外放归的必要性也未明。需对此信息进行评估
- 公众对资金使用是否有价值的怀疑，我们需要说明这点。

5. *Ex Situ* Support for *In Situ* Conservation:

The participants identified the following ways in which the *ex situ* population or *ex situ* community can and should support the conservation of giant pandas in the wild:

- The *ex situ* population should be capable of providing giant pandas for release if this is deemed necessary.
- There is the potential for the exchange of genetic material (via sperm) in both directions between the *in situ* and *ex situ* populations.
- The *ex situ* community is a funding source for research and *in situ* conservation activities.
- There is the potential for technology transfer between the *ex situ* and *in situ* communities. Examples include:
    - Disease risk assessment and prevention in the wild
    - Technology for evaluation the health status of the wild population
    - Techniques for censusing, density estimates, and carrying capacity

- Technology for evaluating the population structure of the wild population
- Techniques for habitat assessment

5．迁地对就地保护的支持

参会者提出通过以下方式，迁地种群或迁地保护机构能够且应该支持野外大熊猫的保护：

- 如果野外放归是必需的，迁地种群应该能提供个体
- 迁地和就地种群相互交换基因物质（精液）是有潜力的
- 迁地保护机构是就地保护和科研活动的资金来源
-迁地和就地机构进行技术交流是有潜力的。例如：
    - 野外疾病风险评估和预防
    - 野外种群健康状况评估的技术
    - 大熊猫普查，密度估算，以及承载能力等技术
    - 野外种群结构评估的技术
    - 栖息地评估的技术

2009 Recommended Actions
2009 建议行动

The following recommendations were proposed to help address the challenges identified above and to work toward the program goals and promote conservation of giant pandas:

以下建议是针对上列挑战，为实现目标和推动保护提出的：

Recommendation 1: Revise the *ex situ* population goal to the maintenance of at least 90% gene diversity for 200 years. This goal can be achieved given the current population status by maintaining a global population of 400-600 giant pandas and increasing genetic management efforts.

建议 1： 修改现行的迁地种群保护目标为：在 200 年内保留 90%遗传多样性。在现有种群状况下，维持全球 400-600 的大熊猫种群，并增强遗传管理，该目标是能够实现的

Recommendation 2: Place greater emphasis on genetic management (quality) of the population, rather than on rapid population growth (quantity). This can be accomplished by following the proposed new breeding strategy of selecting breeding pairs with MSI 1 to 3 (when a choice of mates is available) and concentrating breeding on valuable females and potential founders (wild-caught pandas that have not produced surviving offspring).

建议 2：应更多强种群调遗传管理（质量），而不是快速增长（数量）。遵守提出的繁殖策略就可实现，即选择 MSI 值 1-3 的配对（当配对存在时），侧重于有价值的雌性及潜在建群者（野外捕获并未繁殖存活后代的）。

Recommendation 3: Encourage natural reproductive and parental care behaviors by encouraging natural mating and relying less on artificial insemination, and by placing greater emphasis on allowing females to rear their offspring. Promoting natural reproductive and parental care behaviors will increase the probability of success of any future releases or reintroduction efforts.

建议 3：通过自然交配，减少对人工授精的依赖，来实现鼓励自然交配和亲子育幼行为。更多强掉允许雌性熊猫自行抚育幼崽。推广自然交配和亲子育幼行为会增加未来野外放归的成功几率。

Recommendation 4: Ensure accurate, timely and complete paternity testing using DNA analysis for all giant pandas with uncertain sires, both for the current population and in the future. Accurate pedigree (sire) information is essential to correctly assess the genetic value of each animal and select pairs for breeding for effective genetic management. This has been a HIGH PRIORITY recommendation for several years and need to be addressed.

建议 4：现在和未来都对所有父亲不确定的熊猫进行 DNA 分析， 确保准确、按时的亲子鉴定。准确的谱系信息是衡量每个动物个体遗传价值，进行有效的遗传管理所必需的。需要指出的是，这是对未来几年工作**最最优先**的建议。

a. SFA has instructed CAS to do paternity testing for all giant pandas. Samples have been collected and sent to CAS, and the analysis should be completed this year. If directed to do so, CAS will continue to conduct paternity testing each year.

b. All facilities doing paternity testing should coordinate with each other so that the same markers and techniques are used and the results are comparable.

c. There is the possibility of CAS (neutral facility with no pandas) conducting all of the required paternity testing with funds and support from SFA and CAZG.

a. 国家林业局已将所有大熊猫亲子鉴定的工作交给了中国科学院。收集的样本都已交给了中科院，今年应该完成分析。如得到委托，中科院将继续每年的亲子鉴定。

b. 所有做亲子鉴定的机构都应该互相协作，确保使用同一种标记和技术，结果可以比对。

c. 作为没有大熊猫的中立机构，中科院有可能承接未来所有大熊猫的亲自鉴定工作，由国家林业局和中国动物园协会提供资金。

Recommendation 5: Increase collaboration among institutions within China to promote effective population management and strengthen research and conservation activities for giant pandas.

建议 5：加强中国大熊猫机构的合作，推广有效的种群管理，加强科研和保护活动。

Recommendation 6: Encourage the development of a standardized giant panda state-wide management policy.

建议 6：鼓励开发标准的国家大熊猫管理政策。

Recommendation 7: Include the Chengdu Research Base as part of the wild animal rescue system for pandas.

建议 7：将成都大熊猫基地纳入野外动物救助体系。

Recommendation 8: Explore the possibilities and effects of exchanging sperm between *ex situ* and *in situ* giant panda populations. Sperm from captive genetically valuable males should continue to be collected and stored for future use.

建议 8：寻求迁地和就地保护机构间大熊猫精液交换。应继续收集和储存有遗传价值的圈养熊猫精液，供未来使用。

Recommendation 9: Investigate the taxonomic subspecies issue for giant pandas and the potential implications for *ex situ* and *in situ* management.

建议 9：调查熊猫亚种分类的问题，及其对迁地、就地管理存在的潜在影响。

Recommendation 10: Increase public awareness and encourage the public to take action to conserve giant pandas and financially support giant panda conservation.

建议 10：增强公众意识，鼓励公众采取行动保护大熊猫，并在资金上支持大熊猫保护。

Recommendation 11: Conduct a comprehensive workshop to discuss *in situ* conservation for giant pandas. This should include several components, such as population viability analysis, habitat assessment, disease risk assessment, threats assessment, reintroduction needs, and the role of the *ex situ* population and *ex situ* community in supporting wild giant panda conservation.

建议 11：召开深入的就地大熊猫保护研讨会。应该包括几个因素：种群活力分析， 栖息地评估，疾病风险评估，威胁评估，野外放归的需求， 以及迁地种群和保护机构对野外熊猫保护的支持。

2010 Breeding Recommendations
2010 年繁殖建议

During previous Technical Committee meetings for giant pandas, specific breeding recommendations for each female were made during the meeting. These recommendations were made based on the Mate Suitability Index (MSI) score for each possible male-female breeding pair (Appendix C) and also considered the health, behavior and location of each animal.
在前次技术年会上，对每只雌性都做出了繁殖建议。这些建议是基于每对雌雄配对的 MSI 数值（附录 C），以及每只动物的健康、行为、及所在地做出的。

Because of time limitations at the 2009 Technical Meeting, it was decided that each institution could use the MSI tables themselves to determine the best pairings at the time of breeding instead of making these specific recommendations at the meeting. The MSI tables for the 2010 breeding season can be found in Appendix C of this report, and provides an MSI score for all potential breeding males and females in the population (females listed across the top and males listed on the left). These MSI tables and guidelines for using MSI ratings based on the recommendations above were provided to giant panda holding institutions in December 2009.
由于 2009 年技术会议时间有限，会议决定由各机构根据 MSI 表格，在繁殖期间自行决定最佳配对，而没有对每只个体做出配对建议。在本报告附录 C 中，可以找到种群中所有潜在繁殖雌雄动物的 MSI 值（雌性在表格顶端，雄性列在左侧）。此 MSI 表格和使用原则都是在 2009 年 12 月由各熊猫机构提供的。

APPENDIX A: Giant pandas with uncertain paternity.
附录 A: 大熊猫个体因父本不清对遗传测算的影响

There are 94 pandas in the studbook with uncertain paternity. However, many of these have died and did not contribute genes to the current population. The 74 pandas listed in Table 4 are those with uncertain paternity that affect the current gene pool. Many of these are recent births (born 2008 or 2009). However, several are older animals. Dead animals may be included because, although they are not alive, they have passed on genes to animals in the living population.

列入谱系中的大熊猫有 94 只父本不清。但其中大部分已经死亡且对当前的种群基因库没有做出过贡献。表四列出的 74 只大熊猫是全部父系不清但对现有基因库有影响的个体。其中有许多是新出生的个体（2008，或 2009 年出生），但其中也有不少老年个体。其中还包括已死亡个体。虽然个体已死亡，但业已将其基因传递给当前的圈养种群。

For cubs born in 2008 and 2009, hypothetical sires were created to more accurately reflect the average effect of the multiple potential sires contributing. These hypothetical sires (studbook numbers beginning with an "H") were formed by creating a pedigree for them that reflected what was thought to be the most likely and possible combination of sires. Combinations of potential sires were limited to those combinations that could be produced by creating hypothetical pedigrees for the hypothetical sires. This allowed only combinations of: 1) 50% one possible sire, 50% another; 2) 50% one sire, 25% another and 25% a third; or 3) 25% each of four potential sires. It did not allow for such combinations as 33% each from 3 potential sires because a pedigree could not be formed to result in that combination in one hypothetical sire. Hypothetical sires and the rules for creating them are given in Table 4.

对于 2008 和 2009 年出生的幼仔，为了准确反映多个潜在父本的平均贡献，我们使用了假设父本。这些假设父本（谱系号为 H 打头）是在谱系中最有可能的组合。潜在父本的组合是根据假设父本和假设谱系得来的，只有以下几种可能：1）50%一个可能的父本，50%另外一个；2）50%一个父本，25%另外一个，25%第三个父本；3）四个父本各有 25%可能。 我们没有列入 3 个潜在父本各有 33%可能的组合，因为一个假设父本不可能导致谱系 假设父本和相关规则见表四。

Table 4. Giant pandas with multiple possible sires showing the assumed sires used in the analysis (NM = natural mating; AI = artificial insemination; ? = unknown breeding technique).
表四. 用假设父本分析有多个可能父本的大熊猫 (注：NM 代表本交; AI 代表人工授精; ? 代表未知繁殖技术)

SB# 谱系	Possible sires 可能父本	Assumed Sire used in analysis 分析所用假设父本	Rule 父本分配原则
237	150, 186 (?)	186	1
278	174, 201 (?)	174	1
297	174 (NM), 201 (AI?), 202 (AI?)	174	1
314	174, 201, 202 (?)	201	1
320	119, 135, 149 (?)	149	1
323	150, 186 (?)	186	1
433	308 (NM); 298 (?)	308	1
437	308 (NM); 298 (?)	308	1
439	308, 329 (NM); 298 (?)	329	1
455	308, 329 (NM)	308	1
469	323, 369 (?)	323	1
495	308, 329 (?)	329	1
507	345, 369 (?)	369	1
532	377, 394, 399 (?)	394	1
538	308, 357 (?)	308	1
539	308, 357 (?)	308	1
547	308, 394 (NM); 357 (AI)	394	1
548	308, 394 (NM); 357 (AI)	394	1
549	308, 394 (NM); 357, 415 (AI)	394	1
557	399 (NM); 327 (AI)	399	1
566	399 (NM), 424 (NM)	424	1
631	369, 502 (NM); 357, 503 (AI)	HS631 = 369 (50%), 502 (50%)	1
632	369, 502 (NM); 357, 503 (AI)	HS631 = 369 (50%), 502 (50%)	1
633	369, 424 (NM); 357, 503 (AI)	HS611 = 369 (50%), 424 (50%)	1
634	369, 424 (NM); 357, 503 (AI)	HS611 = 369 (50%), 424 (50%)	1
636	369, 503 (NM); 357 (AI)	H613 = 369 (50%), 503 (50%)	1
638	503 (NM); 467 (AI)	503	1
639	503 (NM); 467 (AI)	503	1
641	502, 503 (NM); 467 (AI)	H642 = 502 (50%), 503 (50%)	1
642	369, 502, 503 (NM); 467 (AI)	HS642 = 369 (50%), 502 (25%), 503 (25%)	1
643	369, 502, 503 (NM); 467 (AI)	HS642 = 369 (50%), 502 (25%), 503 (25%)	1
650	369, 424, 503 (NM); 357 (AI)	HS650 = 424 (50%), 369 (25%), 503 (25%)	1
651	369, 424, 503 (NM); 357 (AI)	HS650 = 424 (50%), 369 (25%), 503 (25%)	1
652	424, 503 (NM); 467 (AI)	HS618 = 424 (50%), 503 (50%)	1
654	369, 424, 479 (NM)	HS654 = 424 (50%), 369 (25%), 479 (25%)	1
664	479 (NM); 467 (AI)	479	1
668	479, 503 (NM); 467 (AI)	HS653 = 479 (50%), 503 (50%)	1
669	479, 503 (NM); 467 (AI)	HS653 = 479 (50%), 503 (50%)	1
682	424, 503 (NM); 467 (AI)	HS618 = 424 (50%), 503 (50%)	1
687	479, 503 (NM); 542 (AI)	HS653 = 479 (50%), 503 (50%)	1
688	479, 503 (NM); 542 (AI)	HS653 = 479 (50%), 503 (50%)	1
692	502 (NM); 467 (AI)	502	1
706	424 (NM), 479 (NM&AI)	424 (50%), 479 (50%)	2

SB# 谱系	Possible sires 可能父本	Assumed Sire used in analysis 分析所用假设父本	Rule 父本分配原则
709	377 (NM); 455, 460 (AI)	377	2
710	377 (NM); 455, 460 (AI)	377	2
711	342, 377, 460 (AI)	377 (50%), 342 (25%), 460 (25%)	3
713	377 (NM); 386 (AI)	377	2
715	377 (NM); 386 (AI)	377	2
717	377, 455 (NM); 390 (AI)	377 (50%), 455 (50%)	2
718	377, 455 (NM); 390 (AI)	377 (50%), 455 (50%)	2
721	502, 503 (NM&AI)	502 (50%), 503 (50%)	2
722	377, 455 (NM); 460 (AI)	377 (50%), 455 (50%)	2
723	377, 455 (NM); 460 (AI)	377 (50%), 455 (50%)	2
724	342, 377 (AI)	342 (50%), 377 (50%)	2b
725	342, 377 (AI)	342 (50%), 377 (50%)	2b
726	377 (NM); 342, 386 (AI)	377	2
727	377, 455 (NM); 460 (AI)	377 (50%), 455 (50%)	2
732	540 (NM); 377 (AI)	540	2
734	424, 488 (NM)	424 (50%), 488 (50%)	2
735	424, 488 (NM)	424 (50%), 488 (50%)	2
736	377, 454 (AI)	377 (50%), 454 (50%)	2b
741	424, 502 (NM)	424 (50%), 502 (50%)	2
743	327, 621 (AI)	327 (50%), 621 (50%)	2b
748	488 (NM); 424 (AI)	488	2
752	488 (NM); 399 (AI)	488	2
753	658, 697 (?)	658 (50%), 697 (50%)	2b
754	658, 697 (?)	658 (50%), 697 (50%)	2b
755	502, 503 (NM)	502 (50%), 503 (50%)	2
756	503, 563 (NM)	503 (50%), 563 (50%)	2
757	377, 658, 697 (?)	377 (50%), 658 (25%), 697 (25%)	3
761	377 (NM); 386 (AI)	377	2
762	377 (NM); 386 (AI)	377	2
763	377 (NM); 540 (AI)	377	2
764	377 (NM): 386, 455 (AI)	377	2

Sire Assignment Rules 父本分配原则

1 Used same sire assumptions as before (2008 and earlier)
与 2008 年和之前分析使用同样的父本假设

2 Sire assumptions based on equal representation of NM males (2 males, 50% each)
父本假设基于参与自然交配的具同等代表性的雄性（2 个雄性，各 50%几率）

2b Sire assumptions based on equal representation of all males (2 males, 50% each)
父本假设基于参与自然交配的所有具同等代表性的雄性（2 个雄性，各 50%几率）

3 Sire assumptions biased toward male with most previous offspring (3 males, one w/ more cubs 50%, other 2 at 25%)
父本假设偏向于有最多幼仔的那个（3 个雄性，拥有最多幼仔的一个 50%，另外 2 个各 25%几率）

APPENDIX B: Ranked mean kinship (MK) list for giant panda captive population – November 2009.
附录 B: 圈养大熊猫种群平均亲缘关系值排序表-2009 年 11 月

Individual giant pandas are listed in order of genetic value for breeding (males on the left; females on the right). Individuals at the top of the list have small mean kinship (MK) values because their genetic lines are under-represented and therefore are valuable breeders. Individuals with high MK values near the bottom of the list are over-represented in the population. The line in the middle of the list represents the average MK value for the population (0.0288); individuals above this line are underrepresented and are priority breeders to increase gene diversity in the population.

下列大熊猫个体是按照繁殖的遗传价值列出的（雄性在左侧，雌性右侧）。在顶端的个体是平均亲缘值（MK）小的，因为它们的基因未被充分代表，因此也是最有价值的繁殖者。在表底是 MK 值高的个体，是基因在种群中被过分代表的。表中间的粗横线是种群的 MK 平均值（0.0288），该横线以上的都是基因未被充分代表的，是优先考虑的繁殖者，能增加种群的遗传多样性。

Males 雄性				**Females 雌性**			
SB# 谱系编号	**MK 平均亲缘关系**	**Age 年龄**	**Location 地点**	**SB# 谱系编号**	**MK 平均亲缘关系**	**Age 年龄**	**Location 地点**
542	0.000	11	YAAN BC	416	0.000	17	QINGDAO W
623	0.000	5	PANYU	660	0.000	12	LOUGUANTA
624	0.000	5	LOUGUANTA	698	0.000	6	YAAN BC
661	0.000	3	YAAN BC	699	0.000	3	LOUGUANTA
696	0.000	14	YAAN BC	700	0.000	3	LOUGUANTA
703	0.000	2	LOUGUANTA	701	0.000	14	YAAN BC
658	0.001	25	LOUGUANTA	702	0.000	2	YAAN BC
697	0.001	14	LOUGUANTA	505	0.001	10	YAAN BC
327	0.002	23	ABERDE HK	581	0.001	7	YAAN BC
357	0.002	20	SHANGHAI	656	0.001	10	YAAN BC
342	0.004	22	YANGZHOU	360	0.002	19	MEXICOCTY
415	0.005	18	SANDIEGOZ	544	0.003	16	YAAN BC
674	0.009	2	BEIJING	507	0.010	9	MEMPHIS
753	0.010	0	LOUGUANTA	754	0.010	0	LOUGUANTA
502	0.012	11	YAAN BC	691	0.013	2	BEIJING
729	0.012	1	YAAN BC	439	0.014	13	YAAN BC
752	0.012	0	YAAN BC	601	0.014	4	PANYU
748	0.013	0	YAAN BC	382	0.015	18	YAAN BC
743	0.014	0	YAAN BC	473	0.015	11	NZP-WASH
526	0.017	9	VIENNA	562	0.015	6	LOUGUANTA
689	0.017	2	YAAN BC	434	0.016	14	KOBE PARK
690	0.017	2	YAAN BC	561	0.016	6	CHENGDU B
386	0.018	17	CHENGDU B	401	0.017	16	CHENGDU B
461	0.018	12	ATLANTA	403	0.017	16	BEIJING

Males 雄性				**Females 雌性**			
SB# 谱系编号	**MK 平均亲缘关系**	**Age 年龄**	**Location 地点**	**SB# 谱系编号**	**MK 平均亲缘关系**	**Age 年龄**	**Location 地点**
719	0.018	1	YAAN BC	739	0.017	1	YAAN BC
606	0.019	4	ABERDE HK	452	0.018	12	ATLANTA
724	0.019	1	CHENGDU B	569	0.018	6	YAAN BC
731	0.019	1	ATLANTA	692	0.018	2	YAAN BC
377	0.020	18	CHENGDU B	757	0.018	0	LOUGUANTA
488	0.020	10	YAAN BC	253	0.019	27	CHONGQING
609	0.020	4	PANYU	425	0.019	14	CHENGDU B
642	0.020	3	NANJING	649	0.019	3	ATLANTA
390	0.021	17	WAKAYAMA	654	0.019	3	YAAN BC
466	0.021	11	MEMPHIS	680	0.019	2	CHENGDU B
503	0.021	11	YAAN BC	725	0.019	1	CHENGDU B
510	0.021	9	CHIANGMAI	759	0.019	0	YAAN BC
756	0.021	0	YAAN BC	760	0.019	0	YAAN BC
713	0.022	1	LOUGUANTA	387	0.020	17	CHENGDU B
736	0.022	1	CHENGDU B	407	0.020	15	CHENGDU B
747	0.022	0	YAAN BC	495	0.020	10	YAAN BC
758	0.022	0	YAAN BC	522	0.020	9	CHENGDU B
520	0.023	9	LUOYANG	643	0.020	3	NANJING
582	0.023	5	SHANGHAIW	678	0.020	2	ANJI BAMB
584	0.023	5	CHENGDU B	385	0.021	17	CHONGQING
613	0.023	4	PANYU	474	0.021	11	YAAN BC
711	0.023	1	CHENGDU B	509	0.021	9	LOUGUANTA
519	0.024	9	MADRID Z	576	0.021	6	MADRID Z
714	0.024	1	YAAN BC	761	0.021	0	CHENGDU B
573	0.025	6	CHENGDU B	762	0.021	0	CHENGDU B
574	0.025	6	CHENGDU B	523	0.022	9	CHENGDU B
614	0.025	4	WAKAYAMA	681	0.022	2	CHENGDU B
662	0.025	3	WAKAYAMA	755	0.022	0	YAAN BC
726	0.025	1	CHENGDU B	480	0.023	10	CHENGDU B
540	0.026	8	CHENGDU B	512	0.023	9	YAAN BC
592	0.026	5	LANZHOU	418	0.024	21	YAAN BC
536	0.027	8	CHENGDU	572	0.024	6	YAAN BC
715	0.027	1	LOUGUANTA	598	0.024	4	CHENGDU B
595	0.028	4	NZP-WASH	637	0.024	3	CHENGDU B
738	0.028	1	WAKAYAMA	712	0.024	1	YAAN BC
742	0.028	0	YAAN BC	566	0.025	6	BEIJING
745	0.028	0	YAAN BC	567	0.025	6	YAAN BC
746	0.028	0	YAAN BC	650	0.025	3	YUNNAN W
467	0.029	11	HUAINAN	651	0.025	3	NANJING
563	0.029	6	YAAN BC	663	0.025	3	WAKAYAMA
685	0.029	2	VIENNA	362	0.027	19	CHENGDU B
749	0.029	0	SANDIEGOZ	603	0.027	4	LOUGUANTA
454	0.030	12	CHENGDU	763	0.027	0	CHENGDU B
575	0.030	6	CHENGDU B	764	0.027	0	CHENGDU B
586	0.030	5	SHANGHAIW	625	0.028	3	YAAN BC

Males 雄性				**Females 雌性**			
SB# 谱系编号	**MK 平均亲缘关系**	**Age 年龄**	**Location 地点**	**SB# 谱系编号**	**MK 平均亲缘关系**	**Age 年龄**	**Location 地点**
607	0.030	4	WUHAN	706	0.028	1	YAAN BC
705	0.030	1	YAAN BC	709	0.028	1	CHENGDU B
732	0.030	1	CHENGDU B	710	0.028	1	CHENGDU B
744	0.030	0	YAAN BC	737	0.028	1	WAKAYAMA
529	0.031	8	CHENGDU B	596	0.029	4	SANDIEGOZ
530	0.031	8	HUAIAN	631	0.029	3	YUNNAN W
620	0.031	4	YAAN BC	632	0.029	3	YAAN BC
721	0.031	1	YAAN BC	694	0.029	2	SANDIEGOZ
633	0.032	3	YAAN BC	741	0.029	0	YAAN BC
636	0.032	3	YAAN BC	537	0.030	8	CHENGDU B
424	0.033	14	YAAN BC	704	0.030	1	YAAN BC
639	0.033	3	YAAN BC	554	0.031	7	CHENGDU B
717	0.033	1	CHENGDU B	555	0.031	7	CHENGDU B
718	0.033	1	CHENGDU B	641	0.031	3	YAAN BC
532	0.034	8	FUZHOU	672	0.031	2	YAAN BC
588	0.034	5	TAIPEI	673	0.031	2	BEIJING
589	0.034	5	TIANJIN	453	0.032	12	CHENGDU B
619	0.034	4	WUHAN	493	0.032	10	CHONGQING
676	0.034	2	CHONGQING	494	0.032	10	LOUGUANTA
518	0.035	9	GUANGZH Z	521	0.032	9	WAKAYAMA
668	0.035	2	YAAN BC	570	0.032	6	CHENGDU B
750	0.035	0	YAAN BC	610	0.032	4	ABERDE HK
413	0.036	15	YAAN BC	634	0.032	3	YUNNAN W
433	0.036	14	KOBE PARK	664	0.032	3	YAAN BC
492	0.036	10	SHANGHAI	740	0.032	0	CHIANGMAI
524	0.036	9	YAAN BC	487	0.033	10	YAAN BC
525	0.036	9	FUZHOU	490	0.033	10	CHENGDU B
564	0.036	6	HANDAN	568	0.033	6	YAAN BC
513	0.037	9	CHONGQING	593	0.033	5	CHENGDU B
599	0.037	4	XIXIAKOU	638	0.033	3	YAAN BC
727	0.037	1	CHENGDU B	734	0.033	1	YAAN BC
583	0.039	5	SHANGHAIW	735	0.033	1	YAAN BC
612	0.039	4	PANYU	491	0.034	10	CHENGDU B
646	0.039	3	CHENGDU B	557	0.034	7	YAAN BC
707	0.039	1	YAAN BC	618	0.034	4	PANYU
708	0.039	1	YAAN BC	648	0.034	3	CHONGQING
458	0.040	12	NZP-WASH	587	0.035	5	TAIPEI
670	0.040	2	CHENGDU B	665	0.035	2	CHENGDU B
688	0.040	2	BEIJING	669	0.035	2	BEIJING
496	0.041	10	BEIJING	751	0.035	0	YAAN BC
538	0.041	8	FUZHOU	511	0.036	9	YAAN BC
666	0.041	2	ANJI BAMB	565	0.036	6	YAAN BC
644	0.045	3	CHENGDU B	682	0.036	2	YAAN BC
460	0.046	12	LOUGUANTA	547	0.037	7	YAAN BC
627	0.046	3	ANJI	548	0.037	7	CHONGQING

Males 雄性				**Females 雌性**			
SB# 谱系编号	**MK 平均亲缘关系**	**Age 年龄**	**Location 地点**	**SB# 谱系编号**	**MK 平均亲缘关系**	**Age 年龄**	**Location 地点**
628	0.046	3	GUIZHOU W	549	0.037	7	YAAN BC
629	0.046	3	ANJI	600	0.037	4	PANYU
630	0.046	3	CHENGDU B	514	0.038	9	VIENNA
399	0.049	16	YAAN BC	635	0.038	3	CHENGDU B
605	0.050	4	XIXIAKOU	722	0.038	1	CHENGDU B
455	0.056	12	CHENGDU B	723	0.038	1	CHENGDU B
394	0.058	17	BEIJING	571	0.039	6	YAAN BC
				611	0.039	4	PANYU
				645	0.039	3	CHENGDU B
				437	0.040	13	YAAN BC
				671	0.040	2	CHENGDU B
				687	0.040	2	BEIJING
				476	0.041	11	YAAN BC
				539	0.041	8	CHIANGMAI
				667	0.041	2	CHENGDU B
				432	0.042	14	YAAN BC
				516	0.042	9	YAAN BC
				477	0.043	11	YAAN BC
				371	0.051	18	SANDIEGOZ

APPENDIX C: Giant panda MSI values for mate selection during the 2010 breeding season (distributed December 2009).
附录 C：2010 年繁殖季大熊猫配对 MSI 值（2009 年 12 月发布）

Dear Giant Panda Holding Institution:
各大熊猫机构：

During previous Technical Committee meetings for giant pandas, specific breeding recommendations for each female were made during the meeting. These recommendations were made based on the Mate Suitability Index (MSI) score for each possible male-female breeding pair and also considered the health, behavior and location of each animal.

在前次技术年会上，对每只雌性都作出了繁殖建议。这些建议是基于每对雌雄配对的 MSI 数值，以及每只动物的健康、行为、及所在地做出的。

In order to grow the population quickly, the past strategy has been to attempt to breed almost all healthy breeding age females. In general, breeding recommendations were confirmed for pairs at institutions with only one male available for breeding or AI. For institutions with multiple available males or sperm samples (for example, Chengdu Panda Base, Wolong, etc.), several males were usually recommended as potential mates, with the strategy that MSI $\leq$ 4 for breeding pairs. Pairings with MSI > 4 were discouraged unless no other alternative was possible, because these pairings are genetically harmful to the population. This strategy promoted rapid population growth while applying some level of genetic management through the selection of males.

为了使得种群取得快速增长，以前的策略都是试图让所有健康的适龄雌性熊猫参与繁殖。总的来讲，给大多数机构的建议都仅仅是一只雄性繁殖或做人工授精。而有多只雄性或精液的机构（如成都基地，卧龙），通常建议多只雄性参与繁殖，配对标准是 MSI 小于或等于 4。MSI 大于 4 的配对不鼓励繁殖，除非没有其他选择，因为这些配对对种群的遗传多样性是有害的。此策略导致了种群数量的快速增长，再选择雄性时也进行了一定程度的遗传管理。

This year the Technical Committee recognized the great success in growing the giant panda population and recommended a change in breeding strategy. Because of time limitations, it was decided that each institution could use the MSI tables themselves to determine the best pairings at the time of breeding instead of making these specific recommendations at the meeting. Several guidelines were discussed in how to use the MSI ratings to select breeding pairs and are discussed below.

今年的技术会议上，与会者意识到种群增长上取得的巨大成功，因此建议更改繁殖策略。由于时间有限， 决定由每个机构使用 MSI 表格自行决定最佳配对，而没有对每只个体作出建议。会上也讨论了一些 MSI 使用原则，来选择适宜的配对，如下所述。

Also included in this document is the MSI table for all potential breeding males and females in the population (females listed across the top and males listed on the left). More detailed information on MSI scores is also provided.

本文件还包括 MSI 表，里面是所有潜在繁殖的雄性和雌性熊猫信息（雌性在顶端，雄性在左侧），还有更详细的 MSI 值。

Guidelines for Selecting Breeding Pairs
配对选择标准

- Given that the population has reached the initial goal of 300 giant pandas, more emphasis can now be placed on genetic management rather than population growth.
- There is no need to attempt to breed all females; breeding efforts should concentrate on genetically valuable females.
- Pairs with MSI = 1 to 3 should be given breeding priority, especially for institutions with pairing choices, as this will improve genetic diversity and reduce inbreeding.
- Efforts should be made to breed any wild-caught pandas that have not produced surviving offspring.
- There may be too much reliance on AI vs. natural mating; perhaps there should be more emphasis on natural mating to encourage natural breeding behavior (necessary for reintroduction).
- AI should be restricted for use only for genetically valuable pairings that must be bred.
- There should be more emphasis on leaving cubs with their mothers for nurturing and behavioral experience (part of the reason is for better chance for success for reintroduction).

- 由于种群已几乎达到了 300 只的最初目标，更多应强调加强遗传管理，而不是种群增长。
- 没有必要试图让所有雌性繁育繁殖。应侧重在有遗传价值的雌性。
- MSI 值在 1-3 的配对应优先考虑，尤其是有多种选择的机构，这将增强遗传多样性，减少近亲繁殖。
- 野外捕获未有存活后代的熊猫应参与繁殖。
- 对人工授精依赖性太强。应考虑强调自然交配，以鼓励自然的繁殖行为（野外方奎所必需的）。
- 应限制人工授精只用在遗传价值高、必需繁殖的配对中。
- 应更多强调让幼崽与母亲呆在一起，进行哺育和行为体验（部分原因是增加野外放归的成功机率）。

MateRx listings
MateRx 目录

We are now using a rating system that calculates an index that indicates how good (or bad) any pair in a population is relative to several measures of genetic importance. The MateRx software (Version 1.90) is designed and developed to be a genetic tool that will guide population management decisions. For every male/female pair in the population, MateRx calculates a single numeric index indicating the relative genetic benefit or detriment to the population of breeding that particular pair. This index, the mate suitability index (or MSI), is calculated from considering each pair's mean kinship values, the difference in the male's and female's mean kinship, the inbreeding coefficient of the offspring produced, and the amount of unknown ancestry in the pair. MateRx is designed to simplify the decisions about which pairs should be bred by condensing all that we know about the genetics of a pair into a single number.

我们当前使用的等级划分系统是通过其测算产生的指数表明某一种群内的任一配对选择与几种遗传重要性量度之间的关系配合程度如何（多好或多坏）。设计和开发 MateRx 软件 (1.90 版) 旨在创立一种指导种群遗传管理决策的工具。对于种群中的任一雌雄大熊猫亲本配对，MateRx 软件将通过计算得出一个的数字性指数，用以说明这一选择对种群的遗传是有益还是有害。我们将这个指数称为交配适宜性指数（或 MSI），其数值是通过雌雄亲本的平均亲缘关系值、雌雄亲本平均亲缘关系的差值、后代的近交系数以及配对亲本的未知祖先数量来计算的。MateRx 软件是为了简化决策过程而设计的，他的目的在于为了将我们对有关配对亲本的所知的全部遗传影响因素转化成一个简单的数字。

MSI values are labeled as beneficial (scores = 1, 2, or 3) or detrimental (scores = 4, 5, or 6) to the population. Beneficial MSIs denote no detrimental effects relative to the genetic values of that pair, and MSI values of 4, 5, or 6 indicate at least one detrimental effect.

对于圈养大熊猫种群来说，MSI 值分为有利（分值=1、2 或 3）或有害（分值 = 4、5、或 6）两类。 MSI 值有利，表明该繁殖亲本配对不会对种群的遗传发生有害的影响，MSI 值如果为 4、5 或 6 预示着至少会有 1 方面产生不良的影响。

MSI Score Definitions :

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1 = very beneficial pair;
2 = moderately beneficial pair;
3 = slightly beneficial pair;

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4 = slightly detrimental pair;
5 = detrimental pair, should only be used if demographically necessary;
6 = very detrimental pair, (should only be used if demographic considerations override preservation of genetic diversity per se).

"-" = so detrimental that the pair should never be bred

MSI 值的含义

1 = 非常有益的配对
2 = 中等有益的配对
3 = 稍有益处的配对

4 = 稍有害处的配对
5 = 有害的配对，仅在种群数量分析认为必要时，才可以使用;
6 = 非常有害的配对，（在只考虑种群数量分析方面的因素而不考虑遗传多样性本身时才可以使用）。

"-" = 此配对十分有害，永远不应进行繁殖

Because the MateRx process is automated, the software is limited in several ways:

由于 MateRx 处理是自动的，因此该软件在如下几个方面存在局限性：

- MateRx does not address demographics, behavior or logistics of a pairing;

  MateRx 软件不能考虑种群数量分析、配对亲本的行为或配对的后勤管理等方面问题。

- MateRx is not intended for use with all captive managed species. Many species have unusual population histories and structures that require the expertise and attention of a trained population biologist. These populations may have characteristics such as few founders, many captive generations, extremely small numbers, or many unknown origins or parentage data that prohibit generic management.

  MateRx 软件不是为所有的圈养动物物种的遗传管理而设计的。因为许多物种具有独特的种群历史和种群结构，需要训练有素的种群生物学家予以专门解决。此类种群可能有类似的特征，如建群者少、已在圈养条件下繁殖多代、种群个体数量极少、或者种群中的多个个体来源或出身不明等，以致于一般性管理无法完成任务。

- MateRx is time sensitive: the MSI rankings are only valid as long as there are no substantial changes in the population. This report should be considered invalid after one year following its date of creation.

  借助 MateRx 软件得到的结果时效性很强：MSI 的等级分类也只在种群未发生实质性变化时才有效。本报告中提供的数据一年后应被认定无效。

	610	678	452	649	403	566	669	673	687	691	362	387	401	407
	ABERDE HK	ANJI BAMB	ATLANTA	ATLANTA	BEIJING	BEIJING	BEIJING	BEIJING	BEIJING	BEIJING	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B
Best →	4	2	1	1	1	2	4	4	4	1	2	2	1	2
327 ABERDE HK	6	2	2	2	1	4	6	4	6	1	4	3	1	3
606 ABERDE HK	4	2	2	2	2	-	6	4	6	2	3	2	2	2
627 ANJI	4	6	6	6	6	4	4	4	5	6	4	6	6	6
629 ANJI	4	6	6	6	6	4	4	4	5	6	4	6	6	6
666 ANJI BAMB	4	6	6	6	6	4	4	4	5	6	4	6	6	6
461 ATLANTA	4	2	2	-	2	3	6	4	6	1	-	-	4	2
731 ATLANTA	4	4	-	-	2	3	6	4	6	2	-	4	4	4
394 BEIJING	5	6	6	6	6	5	-	5	-	6	5	6	6	6
496 BEIJING	5	6	6	6	6	4	4	5	5	6	4	6	6	6
674 BEIJING	6	2	1	2	1	3	6	4	6	1	4	2	1	2
688 BEIJING	6	6	6	6	6	4	-	4	-	6	4	6	6	6
454 CHENGDU	4	3	4	4	4	4	4	4	4	4	-	-	-	3
536 CHENGDU	4	-	-	4	3	4	4	4	4	4	4	3	3	4
377 CHENGDU B	4	2	2	2	2	3	6	4	6	2	3	2	2	2
386 CHENGDU B	4	-	2	2	2	3	6	4	6	1	3	2	2	-
455 CHENGDU B	5	6	6	6	6	4	5	5	6	6	5	6	6	6
529 CHENGDU B	4	4	4	4	4	4	4	4	4	4	-	-	4	4
540 CHENGDU B	4	4	4	4	-	4	4	4	4	4	4	3	3	-
573 CHENGDU B	4	4	4	4	-	2	4	4	4	4	4	3	3	-
574 CHENGDU B	4	4	4	4	-	2	4	4	4	4	4	3	3	-
575 CHENGDU B	4	3	4	4	4	4	4	4	4	4	-	-	-	3
584 CHENGDU B	4	2	3	3	3	4	4	4	6	3	3	2	3	2
630 CHENGDU B	4	6	6	6	6	4	4	4	5	6	4	6	6	6
644 CHENGDU B	4	6	6	6	6	4	4	4	5	6	5	6	6	6
646 CHENGDU B	4	-	-	6	6	4	4	4	5	6	4	4	6	6
670 CHENGDU B	4	6	6	6	6	4	4	4	5	6	4	6	6	6
711 CHENGDU B	4	4	3	3	3	2	4	4	6	3	4	4	4	4
717 CHENGDU B	4	4	4	4	4	4	4	4	4	6	4	4	4	4
718 CHENGDU B	4	4	4	4	4	4	4	4	4	6	4	4	4	4
724 CHENGDU B	4	4	2	2	2	3	6	4	6	1	4	4	6	4
726 CHENGDU B	4	3	3	4	3	2	4	4	4	3	-	-	4	3
727 CHENGDU B	4	4	6	6	6	4	4	4	4	6	4	4	6	4
732 CHENGDU B	4	4	4	4	4	4	4	4	4	4	-	4	4	4
736 CHENGDU B	4	6	4	4	3	2	4	4	6	3	4	4	4	4
510 CHIANGMAI	4	2	2	2	3	3	4	4	6	3	3	2	2	2
513 CHONGQING	4	6	6	6	6	-	5	4	5	6	4	4	6	4
676 CHONGQING	4	4	4	4	4	-	4	4	4	6	-	4	4	4
525 FUZHOU	6	4	6	4	6	4	5	6	5	6	4	4	6	4
532 FUZHOU	4	4	4	4	4	4	5	4	5	6	4	4	4	4
538 FUZHOU	5	6	6	6	6	4	4	5	5	6	4	6	6	6
518 GUANGZH Z	4	4	6	4	6	4	5	4	5	6	4	4	6	4
628 GUIZHOU W	4	6	6	6	6	4	4	4	5	6	4	6	6	6

	610	678	452	649	403	566	669	673	687	691	362	387	401	407
	ABERDE HK	ANJI BAMB	ATLANTA	ATLANTA	BEIJING	BEIJING	BEIJING	BEIJING	BEIJING	BEIJING	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B
Best →	4	2	1	1	1	2	4	4	4	1	2	2	1	2
564 HANDAN	5	4	6	6	6	4	4	5	5	6	4	4	6	4
530 HUAIAN	4	4	4	4	4	4	4	4	4	4	-	-	4	4
467 HUAINAN	4	3	4	4	4	4	4	4	4	4	4	4	4	3
433 KOBE PARK	5	4	6	4	6	4	4	5	5	6	4	4	6	4
592 LANZHOU	4	4	4	4	3	2	4	4	4	4	4	4	4	-
460 LOUGUANTA	5	6	6	6	6	4	6	5	6	6	4	6	6	6
624 LOUGUANTA	6	3	2	2	2	4	6	6	6	1	4	3	2	3
658 LOUGUANTA	6	2	2	2	2	4	6	6	6	1	4	3	2	3
697 LOUGUANTA	6	2	2	2	2	4	6	6	6	1	4	3	2	3
703 LOUGUANTA	6	3	2	2	2	4	6	6	6	1	4	3	2	3
713 LOUGUANTA	4	2	3	2	3	3	4	4	6	3	3	2	3	2
715 LOUGUANTA	4	3	3	4	3	4	4	4	4	4	-	4	4	3
753 LOUGUANTA	6	2	1	2	1	3	6	4	6	1	4	2	1	2
520 LUOYANG	4	4	-	4	3	2	4	4	4	3	3	2	3	2
519 MADRID Z	4	4	-	4	3	2	4	4	4	3	4	2	3	2
466 MEMPHIS	4	2	2	2	2	-	4	4	6	2	3	2	2	2
642 NANJING	4	2	2	2	4	3	4	4	6	4	3	2	2	2
458 NZP-WASH	-	6	6	6	6	4	4	-	5	6	4	6	6	6
595 NZP-WASH	4	4	4	4	4	4	4	4	4	4	4	3	4	4
609 PANYU	4	2	2	2	2	3	4	4	6	2	3	2	2	2
612 PANYU	4	6	6	6	6	-	4	4	4	6	4	6	6	6
613 PANYU	4	3	3	3	3	-	4	4	4	3	2	2	3	2
623 PANYU	6	3	2	2	2	4	6	6	6	1	4	3	2	3
415 SANDIEGOZ	6	2	1	2	1	4	6	4	6	1	4	2	1	2
749 SANDIEGOZ	4	3	4	3	4	4	4	4	4	4	4	3	4	3
357 SHANGHAI	6	2	2	2	1	4	6	4	6	1	4	3	1	2
492 SHANGHAI	5	4	6	4	6	4	4	5	5	6	4	4	6	4
582 SHANGHAIW	-	2	3	2	3	2	4	4	6	3	3	2	3	2
583 SHANGHAIW	4	6	6	6	6	-	4	4	4	6	4	6	6	6
586 SHANGHAIW	4	3	4	3	4	4	4	4	4	4	4	3	4	3
588 TAIPEI	4	4	4	4	6	-	-	4	4	6	4	4	4	4
589 TIANJIN	4	4	4	4	6	-	-	4	4	6	4	4	4	4
526 VIENNA	4	2	2	2	2	3	6	4	6	1	3	3	2	3
685 VIENNA	4	3	3	3	4	4	4	4	4	4	4	3	4	3
390 WAKAYAMA	4	2	2	2	-	3	4	-	6	-	3	2	3	2
614 WAKAYAMA	4	4	4	4	-	2	4	4	4	4	4	3	3	-
662 WAKAYAMA	4	4	4	4	-	2	4	4	4	4	4	3	3	-
738 WAKAYAMA	4	4	4	4	-	4	4	4	4	4	4	3	3	4
607 WUHAN	4	3	4	4	4	4	4	4	-	4	4	3	4	3
619 WUHAN	4	4	4	4	6	-	-	4	4	6	4	4	4	4
599 XIXIAKOU	4	4	6	6	6	-	4	4	5	6	4	4	6	4

	610	678	452	649	403	566	669	673	687	691	362	387	401	407
	ABERDE HK	ANJI BAMB	ATLANTA	ATLANTA	BEIJING	BEIJING	BEIJING	BEIJING	BEIJING	BEIJING	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B
Best →	4	2	1	1	1	2	4	4	4	1	2	2	1	2
605 XIXIAKOU	6	6	6	6	6	4	5	6	6	6	4	6	6	6
399 YAAN BC	5	6	6	6	6	4	6	5	6	6	4	6	6	6
413 YAAN BC	5	4	6	4	6	4	4	5	5	6	4	4	6	4
424 YAAN BC	4	4	4	4	4	-	4	4	4	6	4	4	4	4
488 YAAN BC	4	2	2	2	-	3	6	-	6	-	3	2	2	2
502 YAAN BC	6	2	1	2	1	3	6	4	6	1	4	2	1	2
503 YAAN BC	-	2	2	2	3	3	-	4	-	3	3	2	3	2
524 YAAN BC	6	4	6	4	6	4	5	6	5	6	4	4	6	4
542 YAAN BC	6	3	2	2	2	4	6	6	6	1	4	3	2	3
563 YAAN BC	4	3	4	3	4	4	4	4	4	4	4	3	4	3
620 YAAN BC	4	4	4	4	4	4	4	4	5	-	4	4	4	4
633 YAAN BC	4	4	4	4	4	4	4	4	4	6	4	4	4	4
636 YAAN BC	4	4	4	4	4	4	5	4	5	6	4	4	4	4
639 YAAN BC	-	4	4	4	4	4	5	4	-	6	4	4	4	4
661 YAAN BC	6	3	2	2	2	4	6	6	6	1	4	3	2	3
668 YAAN BC	5	4	4	4	6	4	-	4	-	6	4	4	6	4
689 YAAN BC	4	2	2	2	2	3	6	4	6	1	3	3	2	3
690 YAAN BC	4	2	2	2	2	3	6	4	6	1	3	3	2	3
696 YAAN BC	6	3	2	2	2	4	6	6	6	1	4	3	2	3
705 YAAN BC	4	3	4	4	4	4	4	4	5	4	4	4	4	3
707 YAAN BC	4	6	6	6	6	-	4	4	-	6	4	4	6	4
708 YAAN BC	4	6	6	6	6	-	4	4	-	6	4	4	6	4
714 YAAN BC	-	3	3	3	3	2	6	4	6	3	4	2	3	2
719 YAAN BC	4	2	2	2	2	-	6	4	6	1	3	2	2	2
721 YAAN BC	-	4	4	4	4	4	4	4	5	4	4	4	4	4
729 YAAN BC	-	2	1	1	1	3	6	4	6	1	4	2	1	2
742 YAAN BC	4	3	3	3	4	4	4	4	4	4	4	3	4	3
743 YAAN BC	4	3	1	1	1	3	6	4	6	1	3	3	1	3
744 YAAN BC	-	3	4	3	4	4	6	4	6	4	4	3	4	3
745 YAAN BC	-	3	3	3	3	4	4	4	6	4	4	3	3	3
746 YAAN BC	-	3	3	3	3	4	4	4	6	4	4	3	3	3
747 YAAN BC	-	4	4	4	3	4	4	4	6	3	3	2	3	4
748 YAAN BC	4	2	1	1	-	3	6	-	6	-	4	2	1	2
750 YAAN BC	4	4	4	4	6	4	4	4	4	6	4	4	6	4
752 YAAN BC	6	2	1	2	-	3	6	-	6	-	4	2	1	2
756 YAAN BC	4	2	2	2	3	-	4	4	6	3	3	2	3	2
758 YAAN BC	-	2	3	2	3	3	4	4	6	3	3	2	3	2
342 YANGZHOU	6	2	2	2	1	4	6	4	6	1	4	2	-	2

	425	453	480	490	491	522	523	537	554	555	561	570	593
	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B
Best →	1	4	2	4	4	2	2	3	4	4	1	4	4
327 ABERDE HK	2	6	3	6	6	3	3	4	6	6	1	6	6
606 ABERDE HK	2	4	-	4	4	2	3	4	4	4	2	4	4
627 ANJI	6	5	6	-	-	6	6	5	5	5	6	5	-
629 ANJI	6	5	4	-	-	6	6	5	5	5	6	5	6
666 ANJI BAMB	6	4	-	4	4	6	4	4	4	4	6	4	4
461 ATLANTA	2	4	3	6	6	4	4	4	-	-	2	-	4
731 ATLANTA	-	4	3	4	4	4	4	4	4	4	4	4	4
394 BEIJING	6	5	6	5	5	6	6	5	5	5	6	5	5
496 BEIJING	6	4	4	4	4	6	4	4	4	4	6	4	4
674 BEIJING	2	4	3	6	6	2	3	4	4	4	1	6	6
688 BEIJING	6	4	4	4	4	6	4	4	4	4	6	4	4
454 CHENGDU	4	-	4	-	-	4	4	-	-	-	4	-	-
536 CHENGDU	-	-	2	-	-	3	2	-	-	-	4	-	-
377 CHENGDU B	2	4	3	4	4	2	3	3	4	4	2	4	4
386 CHENGDU B	2	4	3	4	6	-	-	4	4	4	-	4	4
455 CHENGDU B	6	5	6	5	5	6	6	5	5	5	6	5	5
529 CHENGDU B	4	-	4	-	-	4	4	-	-	-	4	-	-
540 CHENGDU B	4	4	2	-	-	4	4	4	4	4	4	4	4
573 CHENGDU B	4	4	2	-	-	4	4	4	4	4	4	4	4
574 CHENGDU B	4	4	2	-	-	4	4	4	4	4	4	4	4
575 CHENGDU B	3	-	4	-	-	4	4	-	-	-	4	-	-
584 CHENGDU B	2	4	-	4	4	2	2	4	4	4	3	4	4
630 CHENGDU B	6	5	4	-	-	6	6	5	5	5	6	5	6
644 CHENGDU B	6	-	4	5	5	6	4	-	6	6	6	6	5
646 CHENGDU B	-	4	4	4	4	4	4	4	4	4	6	4	4
670 CHENGDU B	6	4	4	4	4	-	-	4	4	4	6	4	4
711 CHENGDU B	2	4	2	4	4	-	-	4	4	4	4	4	4
717 CHENGDU B	4	4	-	4	4	4	4	4	4	4	4	4	4
718 CHENGDU B	4	4	-	4	4	4	4	4	4	4	4	4	4
724 CHENGDU B	2	4	3	4	6	-	-	4	4	4	4	4	4
726 CHENGDU B	3	4	2	4	4	4	4	4	-	-	3	-	4
727 CHENGDU B	6	-	4	5	5	4	4	-	6	6	6	6	5
732 CHENGDU B	4	6	4	-	-	4	4	6	-	-	4	-	6
736 CHENGDU B	4	4	2	4	4	4	4	4	4	4	-	4	4
510 CHIANGMAI	2	4	2	4	4	2	2	4	4	4	3	4	4
513 CHONGQING	6	4	4	4	4	4	4	4	4	4	6	4	4
676 CHONGQING	4	6	-	5	5	4	4	6	-	-	4	-	4
525 FUZHOU	4	4	4	4	4	4	4	4	4	4	6	4	4
532 FUZHOU	4	4	4	4	4	4	4	4	4	4	6	4	4
538 FUZHOU	6	4	4	4	4	6	4	4	4	4	6	4	4
518 GUANGZH Z	4	4	4	4	4	4	4	4	4	4	6	4	4
628 GUIZHOU W	6	5	6	-	-	6	6	5	5	5	6	5	-

	425	453	480	490	491	522	523	537	554	555	561	570	593
	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B
Best →	1	4	2	4	4	2	2	3	4	4	1	4	4
564 HANDAN	4	4	4	4	4	4	4	4	4	4	6	4	4
530 HUAIAN	4	-	4	-	-	4	4	-	-	-	4	-	-
467 HUAINAN	3	-	4	-	-	-	-	-	-	-	4	-	-
433 KOBE PARK	4	4	4	4	4	4	4	4	4	4	6	4	4
592 LANZHOU	4	6	2	-	-	6	6	6	4	4	4	4	-
460 LOUGUANTA	6	4	6	4	4	6	6	4	4	4	6	4	4
624 LOUGUANTA	3	6	4	6	6	3	4	6	6	6	1	6	6
658 LOUGUANTA	2	6	3	6	6	3	3	4	6	6	1	6	6
697 LOUGUANTA	2	6	3	6	6	3	3	4	6	6	1	6	6
703 LOUGUANTA	3	6	4	6	6	3	4	6	6	6	1	6	6
713 LOUGUANTA	2	4	2	4	4	2	2	4	4	4	3	4	4
715 LOUGUANTA	3	6	2	4	4	4	4	6	-	-	3	-	4
753 LOUGUANTA	2	4	3	6	6	2	3	4	4	4	1	6	6
520 LUOYANG	-	-	2	-	-	2	2	-	-	-	-	-	-
519 MADRID Z	-	-	2	-	-	2	2	-	-	-	-	-	-
466 MEMPHIS	2	4	-	4	4	2	2	3	4	4	3	4	4
642 NANJING	2	4	3	4	4	2	3	3	4	4	2	4	4
458 NZP-WASH	6	4	4	4	4	6	4	4	4	4	6	4	4
595 NZP-WASH	4	4	4	4	4	3	3	4	4	4	4	4	4
609 PANYU	2	4	3	4	4	2	3	3	4	4	2	4	4
612 PANYU	6	4	-	4	4	6	4	4	4	4	6	4	4
613 PANYU	3	4	-	4	4	2	2	4	4	4	3	4	4
623 PANYU	3	6	4	6	6	3	4	6	6	6	1	6	6
415 SANDIEGOZ	2	6	3	6	6	2	3	4	4	4	1	6	6
749 SANDIEGOZ	3	4	4	4	4	3	4	4	4	4	4	4	4
357 SHANGHAI	2	6	3	6	6	3	3	4	6	6	1	6	6
492 SHANGHAI	4	4	4	4	4	4	4	4	4	4	6	4	4
582 SHANGHAIW	2	4	2	4	4	2	2	4	4	4	3	4	4
583 SHANGHAIW	6	4	-	4	4	6	4	4	4	4	6	4	4
586 SHANGHAIW	3	4	4	4	4	3	4	4	4	4	4	4	4
588 TAIPEI	4	4	-	4	4	4	4	4	4	4	6	4	4
589 TIANJIN	4	4	-	4	4	4	4	4	4	4	6	4	4
526 VIENNA	2	4	3	6	6	3	3	4	4	4	2	4	4
685 VIENNA	3	4	4	4	4	3	4	4	4	4	4	4	4
390 WAKAYAMA	2	4	2	4	4	2	2	4	4	4	3	4	4
614 WAKAYAMA	4	4	2	-	-	4	4	4	4	4	4	4	4
662 WAKAYAMA	4	4	2	-	-	4	4	4	4	4	4	4	4
738 WAKAYAMA	4	4	4	-	-	4	4	4	4	4	4	4	6
607 WUHAN	3	4	4	4	4	3	4	4	4	4	4	4	4
619 WUHAN	4	4	-	4	4	4	4	4	4	4	6	4	4
599 XIXIAKOU	6	4	4	4	4	4	4	4	4	4	6	4	4

	425	453	480	490	491	522	523	537	554	555	561	570	593
	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B
Best →	1	4	2	4	4	2	2	3	4	4	1	4	4
605 XIXIAKOU	6	4	6	5	5	6	6	4	4	4	6	4	4
399 YAAN BC	6	4	6	4	5	6	6	4	4	4	6	4	4
413 YAAN BC	4	4	4	4	4	4	4	4	4	4	6	4	4
424 YAAN BC	4	4	-	4	4	4	4	4	4	4	4	4	4
488 YAAN BC	2	4	3	4	4	2	3	4	4	4	2	4	4
502 YAAN BC	2	4	3	6	6	2	3	4	4	4	1	4	6
503 YAAN BC	2	4	2	4	4	2	2	4	4	4	3	4	4
524 YAAN BC	4	4	4	4	4	4	4	4	4	4	6	4	4
542 YAAN BC	3	6	4	6	6	3	4	6	6	6	1	6	6
563 YAAN BC	3	4	4	4	4	3	4	4	4	4	4	4	4
620 YAAN BC	4	4	4	4	4	4	4	4	4	4	4	4	4
633 YAAN BC	4	4	4	4	4	4	4	4	4	4	4	4	4
636 YAAN BC	4	4	4	4	4	4	4	4	4	4	4	4	4
639 YAAN BC	4	4	4	4	4	4	4	4	4	4	4	4	4
661 YAAN BC	3	6	4	6	6	3	4	6	6	6	1	6	6
668 YAAN BC	4	4	4	4	4	4	4	4	4	4	6	4	4
689 YAAN BC	2	4	3	6	6	3	3	4	4	4	1	4	4
690 YAAN BC	2	4	3	6	6	3	3	4	4	4	1	4	4
696 YAAN BC	3	6	4	6	6	3	4	6	6	6	1	6	6
705 YAAN BC	4	4	4	4	4	4	4	4	4	4	4	4	4
707 YAAN BC	6	4	-	4	4	4	4	4	4	4	6	4	4
708 YAAN BC	6	4	-	4	4	4	4	4	4	4	6	4	4
714 YAAN BC	3	4	2	4	4	2	2	4	4	4	3	4	4
719 YAAN BC	2	4	-	6	6	2	3	4	4	4	2	4	4
721 YAAN BC	4	4	4	4	4	4	4	4	4	4	4	4	4
729 YAAN BC	2	4	3	6	6	2	3	4	4	4	1	4	6
742 YAAN BC	3	4	4	4	4	3	3	4	4	4	4	4	4
743 YAAN BC	1	4	3	6	6	3	3	4	4	4	1	4	6
744 YAAN BC	3	4	4	4	4	3	4	4	4	4	4	4	4
745 YAAN BC	3	4	4	4	4	3	3	4	4	4	4	4	4
746 YAAN BC	3	4	4	4	4	3	3	4	4	4	4	4	4
747 YAAN BC	4	4	2	4	4	2	2	4	4	4	3	4	4
748 YAAN BC	1	4	3	6	6	2	3	4	4	4	1	4	6
750 YAAN BC	4	4	4	4	4	4	4	4	4	4	6	4	4
752 YAAN BC	2	4	3	6	6	2	3	4	4	4	1	4	6
756 YAAN BC	2	4	2	4	4	2	2	4	4	4	3	4	4
758 YAAN BC	2	4	2	4	4	2	2	4	4	4	3	4	4
342 YANGZHOU	2	6	3	6	6	2	3	4	4	4	1	6	6

	598	635	637	645	665	667	671	680	681	709	710	722	723
	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B
Best →	2	4	2	4	4	4	4	1	2	3	3	4	4
327 ABERDE HK	4	6	4	6	6	6	6	2	3	4	4	6	6
606 ABERDE HK	3	6	3	6	6	6	6	2	3	3	3	6	6
627 ANJI	4	-	4	-	-	-	-	6	6	-	-	-	-
629 ANJI	4	-	4	-	-	-	-	6	6	5	5	-	-
666 ANJI BAMB	4	-	4	-	-	-	-	6	4	4	4	5	5
461 ATLANTA	-	6	-	6	6	6	6	4	4	3	3	6	6
731 ATLANTA	4	6	4	6	6	6	6	4	4	4	4	6	6
394 BEIJING	6	5	6	5	5	5	5	6	6	5	5	5	5
496 BEIJING	4	5	4	5	5	5	5	6	4	4	4	4	4
674 BEIJING	3	6	3	6	6	6	6	2	3	4	4	6	6
688 BEIJING	4	5	4	5	5	5	5	6	4	4	4	4	4
454 CHENGDU	4	5	4	4	4	4	4	4	-	4	4	5	5
536 CHENGDU	4	4	4	-	4	4	4	3	6	4	4	4	4
377 CHENGDU B	3	6	3	6	4	6	6	2	3	-	-	-	-
386 CHENGDU B	-	6	-	6	6	6	-	-	3	4	4	6	6
455 CHENGDU B	6	-	6	-	-	-	-	6	6	5	5	-	-
529 CHENGDU B	-	4	-	4	4	4	4	4	6	4	4	5	5
540 CHENGDU B	4	4	4	4	4	4	4	4	2	4	4	4	4
573 CHENGDU B	4	4	4	4	4	4	4	4	2	4	4	4	4
574 CHENGDU B	4	4	4	4	4	4	4	4	2	4	4	4	4
575 CHENGDU B	4	5	4	4	4	4	4	4	-	4	4	5	5
584 CHENGDU B	2	4	2	4	4	-	6	2	2	-	-	4	4
630 CHENGDU B	4	-	4	-	-	-	-	6	6	5	5	-	-
644 CHENGDU B	4	-	4	-	-	-	-	6	6	4	4	6	6
646 CHENGDU B	4	-	4	-	-	-	-	6	4	4	4	5	5
670 CHENGDU B	4	-	4	-	-	-	-	6	4	4	4	5	5
711 CHENGDU B	4	4	4	4	4	6	6	6	4	4	4	4	4
717 CHENGDU B	4	5	4	5	5	-	5	4	4	4	4	-	-
718 CHENGDU B	4	5	4	5	5	-	5	4	4	4	4	-	-
724 CHENGDU B	4	6	4	6	6	6	-	6	4	4	4	6	6
726 CHENGDU B	-	4	-	4	4	4	4	4	4	-	-	4	4
727 CHENGDU B	4	6	4	5	5	5	5	6	4	6	6	-	-
732 CHENGDU B	4	4	4	4	4	4	4	4	4	4	4	5	5
736 CHENGDU B	4	4	4	6	4	6	6	4	4	4	4	6	6
510 CHIANGMAI	3	6	3	6	4	6	6	2	2	3	3	6	6
513 CHONGQING	4	4	4	4	4	4	4	6	4	4	4	4	4
676 CHONGQING	4	4	4	4	4	5	4	4	4	4	4	4	4
525 FUZHOU	4	4	4	4	4	4	4	4	4	4	4	4	4
532 FUZHOU	4	4	4	4	4	4	4	4	4	4	4	4	4
538 FUZHOU	4	5	4	5	5	5	5	6	4	4	4	4	4
518 GUANGZH Z	4	4	4	4	4	4	4	4	4	4	4	4	4
628 GUIZHOU W	4	-	4	-	-	-	-	6	6	-	-	-	-

	598	635	637	645	665	667	671	680	681	709	710	722	723
	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B
Best →	2	4	2	4	4	4	4	1	2	3	3	4	4
564 HANDAN	4	5	4	5	5	5	5	6	4	4	4	4	4
530 HUAIAN	-	4	-	4	4	4	4	4	6	4	4	5	5
467 HUAINAN	4	4	4	4	4	4	5	4	6	4	4	5	5
433 KOBE PARK	4	5	4	5	5	5	5	4	4	4	4	4	4
592 LANZHOU	4	4	4	4	4	4	4	4	4	4	4	4	4
460 LOUGUANTA	4	5	4	5	5	5	5	6	6	4	4	5	5
624 LOUGUANTA	4	6	4	6	6	6	6	3	3	4	4	6	6
658 LOUGUANTA	4	6	4	6	6	6	6	2	3	4	4	6	6
697 LOUGUANTA	4	6	4	6	6	6	6	2	3	4	4	6	6
703 LOUGUANTA	4	6	4	6	6	6	6	3	3	4	4	6	6
713 LOUGUANTA	2	4	2	6	4	6	6	2	2	-	-	6	6
715 LOUGUANTA	4	4	4	4	4	4	4	4	4	-	-	6	6
753 LOUGUANTA	3	6	3	6	6	6	6	2	3	4	4	6	6
520 LUOYANG	2	4	2	4	-	6	6	3	-	4	4	4	4
519 MADRID Z	2	4	2	4	-	4	4	3	-	4	4	4	4
466 MEMPHIS	3	6	3	6	4	-	6	2	2	3	3	6	6
642 NANJING	3	6	3	6	4	6	6	2	2	3	3	6	6
458 NZP-WASH	4	5	4	5	5	5	5	6	4	4	4	4	4
595 NZP-WASH	4	4	4	5	4	4	4	3	3	4	4	4	4
609 PANYU	3	6	3	6	4	6	6	2	2	3	3	6	6
612 PANYU	4	4	4	4	4	5	4	6	4	4	4	4	4
613 PANYU	2	4	2	4	4	6	4	3	2	4	4	4	4
623 PANYU	4	6	4	6	6	6	6	3	3	4	4	6	6
415 SANDIEGOZ	3	6	3	6	6	6	6	2	3	4	4	6	6
749 SANDIEGOZ	4	4	4	4	4	4	4	3	3	4	4	4	4
357 SHANGHAI	3	6	3	6	6	6	6	2	3	4	4	6	6
492 SHANGHAI	4	5	4	5	5	5	5	4	4	4	4	4	4
582 SHANGHAIW	2	4	2	4	4	6	6	2	2	3	3	4	4
583 SHANGHAIW	4	4	4	4	4	5	4	6	4	4	4	4	4
586 SHANGHAIW	4	4	4	4	4	4	4	3	4	4	4	4	4
588 TAIPEI	4	4	4	4	4	5	4	4	4	4	4	4	4
589 TIANJIN	4	4	4	4	4	5	4	4	4	4	4	4	4
526 VIENNA	3	6	3	6	6	6	6	2	3	4	4	6	6
685 VIENNA	4	4	4	4	4	4	4	3	3	4	4	4	4
390 WAKAYAMA	3	6	3	6	4	6	6	2	2	3	3	6	6
614 WAKAYAMA	4	4	4	4	4	4	4	4	2	4	4	4	4
662 WAKAYAMA	4	4	4	4	4	4	4	4	2	4	4	4	4
738 WAKAYAMA	4	4	4	4	4	4	4	4	4	4	4	4	4
607 WUHAN	4	4	4	4	4	4	4	3	4	4	4	4	4
619 WUHAN	4	4	4	4	4	5	4	4	4	4	4	4	4
599 XIXIAKOU	4	-	4	-	-	-	-	6	4	4	4	5	5

	598	635	637	645	665	667	671	680	681	709	710	722	723
	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B
Best →	2	4	2	4	4	4	4	1	2	3	3	4	4
605 XIXIAKOU	6	-	6	-	-	-	-	6	6	4	4	5	5
399 YAAN BC	4	5	4	5	5	5	5	6	6	4	4	5	5
413 YAAN BC	4	5	4	5	5	5	5	4	4	4	4	4	4
424 YAAN BC	4	4	4	4	4	-	4	4	4	4	4	4	4
488 YAAN BC	3	6	3	6	4	6	6	2	3	3	3	6	6
502 YAAN BC	3	6	3	6	6	6	6	2	3	4	4	6	6
503 YAAN BC	3	6	3	6	4	6	6	2	2	3	3	6	6
524 YAAN BC	4	4	4	4	4	4	4	4	4	4	4	4	4
542 YAAN BC	4	6	4	6	6	6	6	3	3	4	4	6	6
563 YAAN BC	4	4	4	4	4	4	4	3	3	4	4	4	4
620 YAAN BC	4	-	4	-	-	-	-	4	4	4	4	5	5
633 YAAN BC	4	4	4	4	4	4	4	4	4	4	4	4	4
636 YAAN BC	4	4	4	4	4	4	4	4	4	4	4	4	4
639 YAAN BC	4	4	4	4	4	4	4	4	4	4	4	4	4
661 YAAN BC	4	6	4	6	6	6	6	3	3	4	4	6	6
668 YAAN BC	4	4	4	4	4	4	4	4	4	4	4	4	4
689 YAAN BC	3	6	3	6	6	6	6	2	3	4	4	6	6
690 YAAN BC	3	6	3	6	6	6	6	2	3	4	4	6	6
696 YAAN BC	4	6	4	6	6	6	6	3	3	4	4	6	6
705 YAAN BC	4	4	4	4	4	4	4	4	4	4	4	4	4
707 YAAN BC	4	4	4	4	4	6	4	6	4	4	4	4	4
708 YAAN BC	4	4	4	4	4	6	4	6	4	4	4	4	4
714 YAAN BC	2	4	2	4	4	4	4	3	2	4	4	4	4
719 YAAN BC	3	6	3	6	6	6	6	2	3	3	3	6	6
721 YAAN BC	4	4	4	4	4	4	4	4	4	4	4	4	4
729 YAAN BC	3	6	3	6	6	6	6	2	3	4	4	6	6
742 YAAN BC	4	4	4	4	4	4	4	3	3	4	4	4	4
743 YAAN BC	3	6	3	6	6	6	6	1	3	4	4	6	6
744 YAAN BC	4	4	4	4	4	4	4	3	4	4	4	4	4
745 YAAN BC	4	4	4	4	4	4	4	3	3	4	4	4	4
746 YAAN BC	4	4	4	4	4	4	4	3	3	4	4	4	4
747 YAAN BC	2	4	2	6	4	6	6	2	2	4	4	4	4
748 YAAN BC	3	6	3	6	6	6	6	1	3	4	4	6	6
750 YAAN BC	4	4	4	4	4	4	4	4	4	4	4	4	4
752 YAAN BC	3	6	3	6	6	6	6	2	3	4	4	6	6
756 YAAN BC	2	6	2	6	4	6	6	2	2	3	3	6	6
758 YAAN BC	2	6	2	6	4	6	6	2	2	3	3	6	6
342 YANGZHOU	3	-	3	6	6	6	6	-	-	4	4	6	6

	725	761	762	763	764	539	740	253	385	493	548	648	434
	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHIANGMAI	CHIANGMAI	CHONGQING	CHONGQING	CHONGQING	CHONGQING	CHONGQING	KOBE PARK
Best →	1	2	2	2	2	4	4	1	2	4	4	4	1
327 ABERDE HK	2	3	3	4	4	6	6	2	3	6	6	6	1
606 ABERDE HK	2	2	2	3	3	6	4	-	-	4	6	-	2
627 ANJI	6	6	6	4	4	5	5	6	6	5	5	4	6
629 ANJI	6	6	6	4	4	5	5	6	6	5	5	4	6
666 ANJI BAMB	6	6	6	4	4	5	5	-	-	4	4	5	6
461 ATLANTA	4	4	4	4	4	6	4	2	3	-	6	6	-
731 ATLANTA	2	4	4	4	4	6	4	2	2	4	6	4	4
394 BEIJING	6	6	6	5	5	-	5	6	6	5	-	5	-
496 BEIJING	6	6	6	4	4	-	-	6	6	4	5	4	6
674 BEIJING	1	3	3	4	4	6	6	2	2	6	6	6	1
688 BEIJING	6	4	4	4	4	5	5	6	6	4	5	4	6
454 CHENGDU	4	4	4	6	-	4	4	4	4	-	4	6	4
536 CHENGDU	3	3	3	4	4	4	4	3	3	-	4	4	3
377 CHENGDU B	-	-	-	-	-	6	4	2	2	4	6	4	2
386 CHENGDU B	-	3	3	3	3	6	4	2	2	4	6	6	2
455 CHENGDU B	6	6	6	5	5	-	-	6	6	5	5	5	6
529 CHENGDU B	4	4	4	-	6	4	4	4	4	-	4	-	4
540 CHENGDU B	4	3	3	4	4	4	4	3	3	4	4	4	3
573 CHENGDU B	4	2	2	4	4	4	4	3	3	4	4	4	3
574 CHENGDU B	4	2	2	4	4	4	4	3	3	4	4	4	3
575 CHENGDU B	4	4	4	6	-	4	4	3	3	-	4	6	4
584 CHENGDU B	4	-	-	-	-	6	4	-	-	4	4	4	3
630 CHENGDU B	6	6	6	4	4	5	5	6	6	5	5	4	6
644 CHENGDU B	6	6	6	4	-	5	5	6	6	6	4	4	6
646 CHENGDU B	6	4	4	4	4	5	5	6	4	4	4	4	6
670 CHENGDU B	-	4	4	4	4	5	5	6	6	4	4	4	6
711 CHENGDU B	6	4	4	4	4	6	4	2	2	4	4	4	4
717 CHENGDU B	4	4	4	4	4	4	4	-	-	4	4	5	4
718 CHENGDU B	4	4	4	4	4	4	4	-	-	4	4	5	4
724 CHENGDU B	-	4	4	4	4	6	4	2	2	4	6	4	2
726 CHENGDU B	4	-	-	-	-	4	4	3	2	-	4	4	3
727 CHENGDU B	6	6	6	6	-	4	4	6	4	6	4	4	6
732 CHENGDU B	4	4	4	4	4	4	4	3	3	-	4	4	4
736 CHENGDU B	4	4	4	4	6	6	4	2	2	4	4	4	3
510 CHIANGMAI	2	2	2	3	3	6	-	2	2	4	6	4	3
513 CHONGQING	6	4	4	4	4	5	4	6	4	4	-	4	6
676 CHONGQING	4	4	4	4	4	4	4	-	-	-	4	-	6
525 FUZHOU	6	4	4	4	4	5	4	4	4	4	-	4	6
532 FUZHOU	4	4	4	4	4	5	4	4	4	4	-	4	6
538 FUZHOU	6	6	6	4	4	-	-	6	6	4	5	4	6
518 GUANGZH Z	4	4	4	4	4	5	5	4	4	4	-	4	6
628 GUIZHOU W	6	6	6	4	4	5	5	6	6	5	5	4	6

	725	761	762	763	764	539	740	253	385	493	548	648	434
	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHIANGMAI	CHIANGMAI	CHONGQING	CHONGQING	CHONGQING	CHONGQING	CHONGQING	KOBE PARK
Best →	1	2	2	2	2	4	4	1	2	4	4	4	1
564 HANDAN	6	4	4	4	4	-	5	4	4	4	5	4	6
530 HUAIAN	4	4	4	-	6	4	4	4	4	-	4	-	4
467 HUAINAN	4	4	4	4	6	4	4	3	3	-	4	4	4
433 KOBE PARK	6	4	4	4	4	-	5	4	4	4	5	4	6
592 LANZHOU	4	4	4	4	4	4	4	3	3	4	4	4	3
460 LOUGUANTA	6	6	6	4	4	-	5	6	6	4	-	4	-
624 LOUGUANTA	2	3	3	4	4	6	6	3	3	6	6	6	1
658 LOUGUANTA	2	3	3	4	4	6	6	2	3	6	6	6	1
697 LOUGUANTA	2	3	3	4	4	6	6	2	3	6	6	6	1
703 LOUGUANTA	2	3	3	4	4	6	6	3	3	6	6	6	1
713 LOUGUANTA	4	-	-	-	-	6	4	2	2	4	4	4	3
715 LOUGUANTA	4	-	-	-	-	4	4	3	3	-	4	4	4
753 LOUGUANTA	4	4	4	4	4	6	6	2	2	6	6	6	1
520 LUOYANG	3	2	2	4	4	6	4	3	2	-	4	4	3
519 MADRID Z	3	2	2	4	4	6	4	3	2	-	4	4	3
466 MEMPHIS	2	2	2	3	3	6	4	-	-	4	6	-	3
642 NANJING	2	2	2	3	3	6	4	2	2	4	6	4	3
458 NZP-WASH	6	4	4	4	4	-	5	6	6	4	5	4	6
595 NZP-WASH	3	3	3	4	4	5	4	3	3	4	4	4	4
609 PANYU	2	2	2	3	3	6	4	2	2	4	6	4	4
612 PANYU	6	4	4	4	4	6	4	-	-	4	5	-	6
613 PANYU	3	2	2	2	2	6	4	-	-	4	4	-	3
623 PANYU	2	3	3	4	4	6	6	3	3	6	6	6	1
415 SANDIEGOZ	2	3	3	4	4	6	6	2	2	6	6	6	1
749 SANDIEGOZ	3	3	3	4	4	5	4	3	3	4	4	4	4
357 SHANGHAI	2	3	3	4	4	6	6	2	3	6	6	6	1
492 SHANGHAI	4	4	4	4	4	-	5	4	4	4	5	4	6
582 SHANGHAIW	3	2	2	3	3	6	4	2	2	4	4	4	3
583 SHANGHAIW	6	4	4	4	4	6	4	-	-	4	5	-	6
586 SHANGHAIW	4	4	4	4	4	5	4	3	3	4	5	4	4
588 TAIPEI	4	4	4	4	4	4	4	-	-	4	4	-	6
589 TIANJIN	4	4	4	4	4	4	4	-	-	4	4	-	6
526 VIENNA	2	3	3	3	3	-	-	2	3	4	6	6	1
685 VIENNA	3	3	3	4	4	6	4	3	3	4	-	4	4
390 WAKAYAMA	2	2	2	3	3	6	4	2	2	4	6	4	3
614 WAKAYAMA	4	2	2	4	4	4	4	3	3	4	4	4	3
662 WAKAYAMA	4	2	2	4	4	4	4	3	3	4	4	4	3
738 WAKAYAMA	3	3	3	4	4	4	4	3	3	4	4	4	4
607 WUHAN	4	4	4	4	4	5	4	3	3	4	4	4	4
619 WUHAN	4	4	4	4	4	4	4	-	-	4	4	-	6
599 XIXIAKOU	6	4	4	4	4	5	5	4	4	4	-	4	6

	725	761	762	763	764	539	740	253	385	493	548	648	434
	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHENGDU B	CHIANGMAI	CHIANGMAI	CHONGQING	CHONGQING	CHONGQING	CHONGQING	CHONGQING	KOBE PARK
Best →	1	2	2	2	2	4	4	1	2	4	4	4	1
605 XIXIAKOU	6	6	6	4	4	-	6	6	6	4	5	5	6
399 YAAN BC	6	6	6	4	4	-	5	6	6	4	-	5	-
413 YAAN BC	6	4	4	4	4	-	5	4	4	4	5	4	6
424 YAAN BC	4	4	4	4	4	4	4	-	-	4	4	-	4
488 YAAN BC	2	2	2	3	3	6	4	2	2	4	6	4	2
502 YAAN BC	1	2	2	4	4	6	4	2	2	6	6	6	1
503 YAAN BC	2	2	2	3	3	6	4	2	2	4	6	4	3
524 YAAN BC	6	4	4	4	4	5	4	4	4	4	-	4	6
542 YAAN BC	2	3	3	4	4	6	6	3	3	6	6	6	1
563 YAAN BC	4	3	3	4	4	5	4	3	3	4	5	4	4
620 YAAN BC	4	4	4	4	4	5	4	4	4	4	4	4	4
633 YAAN BC	4	4	4	4	4	4	4	4	4	4	5	4	4
636 YAAN BC	4	4	4	4	4	6	4	4	4	4	5	4	4
639 YAAN BC	4	4	4	4	4	5	4	4	4	4	4	4	4
661 YAAN BC	2	3	3	4	4	6	6	3	3	6	6	6	1
668 YAAN BC	4	4	4	4	4	4	4	4	4	4	5	4	6
689 YAAN BC	2	3	3	3	3	6	4	2	3	4	6	6	1
690 YAAN BC	2	3	3	3	3	6	4	2	3	4	6	6	1
696 YAAN BC	2	3	3	4	4	6	6	3	3	6	6	6	1
705 YAAN BC	4	4	4	4	4	4	4	3	4	4	5	4	4
707 YAAN BC	6	4	4	4	4	5	4	-	-	4	4	-	6
708 YAAN BC	6	4	4	4	4	5	4	-	-	4	4	-	6
714 YAAN BC	3	2	2	4	2	6	4	3	2	4	4	4	3
719 YAAN BC	2	3	3	3	3	6	4	-	-	4	6	-	2
721 YAAN BC	4	4	4	4	4	5	4	4	4	4	4	4	4
729 YAAN BC	1	3	3	4	4	6	4	2	2	6	6	6	1
742 YAAN BC	3	3	3	4	4	6	4	3	3	4	4	4	4
743 YAAN BC	1	3	3	3	3	6	4	1	3	4	6	6	1
744 YAAN BC	4	4	4	4	4	4	4	3	3	4	5	4	4
745 YAAN BC	3	3	3	4	4	4	4	3	3	4	4	4	4
746 YAAN BC	3	3	3	4	4	4	4	3	3	4	4	4	4
747 YAAN BC	3	2	2	3	3	6	4	2	2	4	4	4	3
748 YAAN BC	1	3	3	4	3	6	4	2	2	4	6	6	1
750 YAAN BC	4	4	4	4	4	5	4	4	4	4	5	4	6
752 YAAN BC	1	2	2	4	4	6	6	2	2	6	6	6	1
756 YAAN BC	2	2	2	3	3	6	4	2	2	4	-	4	4
758 YAAN BC	2	2	2	3	3	6	4	2	2	4	4	4	3
342 YANGZHOU	-	3	3	4	4	6	6	2	3	6	6	6	1

	494	509	562	603	660	699	700	754	757	576	507	360
	LOUGUANTA	LOUGUANTA	LOUGUANTA	LOUGUANTA	LOUGUANTA	LOUGUANTA	LOUGUANTA	LOUGUANTA	LOUGUANTA	MADRID Z	MEMPHIS	MEXICOCTY
Best →	4	2	1	3	1	1	1	1	1	2	1	1
327 ABERDE HK	6	3	1	4	1	1	1	1	2	3	1	1
606 ABERDE HK	4	3	2	3	2	2	2	2	2	2	2	2
627 ANJI	5	6	6	4	6	6	6	6	6	6	6	6
629 ANJI	5	6	6	4	6	6	6	6	6	6	6	6
666 ANJI BAMB	4	4	6	4	6	6	6	6	6	6	6	6
461 ATLANTA	-	3	1	3	2	2	2	1	2	4	1	2
731 ATLANTA	4	3	2	3	2	2	2	2	2	4	2	2
394 BEIJING	5	6	6	-	6	6	6	6	6	6	6	6
496 BEIJING	4	6	6	5	6	6	6	6	6	6	6	6
674 BEIJING	6	3	1	4	1	1	1	1	1	2	1	1
688 BEIJING	4	4	6	4	6	6	6	6	6	4	6	6
454 CHENGDU	-	4	4	4	6	6	6	4	4	4	4	4
536 CHENGDU	-	3	3	4	4	4	4	4	3	3	4	4
377 CHENGDU B	4	2	-	3	3	3	3	-	-	-	2	2
386 CHENGDU B	4	3	2	3	2	2	2	2	2	3	1	2
455 CHENGDU B	5	-	6	5	6	6	6	6	6	6	6	6
529 CHENGDU B	-	4	4	4	6	6	6	6	4	4	4	6
540 CHENGDU B	4	2	3	4	4	4	4	4	3	3	4	4
573 CHENGDU B	4	2	3	4	4	4	4	4	3	2	4	4
574 CHENGDU B	4	2	3	4	4	4	4	4	3	2	4	4
575 CHENGDU B	-	4	4	4	6	6	6	4	4	4	4	4
584 CHENGDU B	4	2	-	3	3	3	3	4	4	-	3	3
630 CHENGDU B	5	6	6	4	6	6	6	6	6	6	6	6
644 CHENGDU B	6	6	6	4	6	6	6	6	6	6	6	6
646 CHENGDU B	4	4	6	4	6	6	6	6	6	4	6	6
670 CHENGDU B	4	4	6	4	6	6	6	6	6	6	6	6
711 CHENGDU B	4	2	4	4	4	4	4	4	4	-	3	3
717 CHENGDU B	4	4	4	4	6	6	6	6	4	4	6	6
718 CHENGDU B	4	4	4	4	6	6	6	6	4	4	6	6
724 CHENGDU B	4	3	4	3	2	2	2	4	4	-	2	2
726 CHENGDU B	-	2	-	4	4	4	4	4	4	-	3	3
727 CHENGDU B	6	4	6	4	6	6	6	6	6	6	6	6
732 CHENGDU B	-	4	4	4	6	6	6	4	4	4	4	4
736 CHENGDU B	4	2	4	3	3	3	3	4	4	4	3	3
510 CHIANGMAI	4	-	3	3	3	3	3	2	-	2	2	2
513 CHONGQING	4	4	6	4	6	6	6	6	6	4	6	6
676 CHONGQING	-	4	6	4	6	6	6	6	4	4	6	6
525 FUZHOU	4	4	6	4	6	6	6	6	6	4	6	6
532 FUZHOU	4	4	6	4	6	6	6	6	4	4	6	6
538 FUZHOU	4	6	6	5	6	6	6	6	6	6	6	6
518 GUANGZH Z	4	4	6	4	6	6	6	6	6	4	6	6
628 GUIZHOU W	5	6	6	4	6	6	6	6	6	6	6	6

	494	509	562	603	660	699	700	754	757	576	507	360
	LOUGUANTA	LOUGUANTA	LOUGUANTA	LOUGUANTA	LOUGUANTA	LOUGUANTA	LOUGUANTA	LOUGUANTA	LOUGUANTA	MADRID Z	MEMPHIS	MEXICOCTY
Best →	4	2	1	3	1	1	1	1	1	2	1	1
564 HANDAN	4	4	6	4	6	6	6	6	6	4	6	6
530 HUAIAN	-	4	4	4	6	6	6	6	4	4	4	6
467 HUAINAN	-	3	4	4	4	4	4	4	4	-	4	4
433 KOBE PARK	4	4	6	4	6	6	6	6	6	4	6	6
592 LANZHOU	4	2	3	4	4	4	4	4	3	4	4	4
460 LOUGUANTA	4	6	6	-	6	6	6	6	6	6	6	6
624 LOUGUANTA	6	3	1	4	1	1	1	1	2	3	1	1
658 LOUGUANTA	6	3	1	4	1	1	1	-	4	3	1	1
697 LOUGUANTA	6	3	1	4	1	1	1	-	4	3	1	1
703 LOUGUANTA	6	3	1	4	1	1	1	1	2	3	1	1
713 LOUGUANTA	4	-	-	3	3	3	3	4	-	-	3	3
715 LOUGUANTA	-	3	-	4	4	4	4	4	4	-	4	4
753 LOUGUANTA	6	3	-	4	1	1	1	-	6	4	1	1
520 LUOYANG	-	2	3	3	4	4	4	3	3	2	3	3
519 MADRID Z	-	2	3	4	4	4	4	3	3	2	3	3
466 MEMPHIS	4	2	3	3	3	3	3	2	2	2	2	2
642 NANJING	4	4	3	3	3	3	3	2	4	2	4	2
458 NZP-WASH	4	4	6	5	6	6	6	6	6	6	6	6
595 NZP-WASH	4	3	4	6	4	4	4	4	3	3	4	4
609 PANYU	4	2	3	4	3	3	3	2	2	2	2	2
612 PANYU	4	4	6	4	6	6	6	6	6	4	6	6
613 PANYU	4	2	3	3	4	4	4	3	3	2	3	3
623 PANYU	6	3	1	4	1	1	1	1	2	3	1	1
415 SANDIEGOZ	6	3	1	4	1	1	1	1	1	3	1	1
749 SANDIEGOZ	4	3	4	4	4	4	4	4	4	3	4	4
357 SHANGHAI	6	3	1	4	1	1	1	1	2	3	1	1
492 SHANGHAI	4	4	-	-	6	6	6	6	6	4	6	6
582 SHANGHAIW	4	2	3	4	3	3	3	3	3	2	3	3
583 SHANGHAIW	4	4	6	4	6	6	6	6	6	4	6	6
586 SHANGHAIW	4	4	4	4	4	4	4	4	4	3	4	4
588 TAIPEI	4	4	6	4	6	6	6	6	4	4	6	6
589 TIANJIN	4	4	6	4	6	6	6	6	4	4	6	6
526 VIENNA	4	-	1	3	2	2	2	1	4	3	1	1
685 VIENNA	4	4	4	4	4	4	4	4	4	3	4	4
390 WAKAYAMA	4	2	3	3	3	3	3	2	2	2	4	3
614 WAKAYAMA	4	2	3	4	4	4	4	4	3	2	4	4
662 WAKAYAMA	4	2	3	4	4	4	4	4	3	2	4	4
738 WAKAYAMA	4	3	4	4	4	4	4	4	3	3	4	4
607 WUHAN	4	4	4	4	6	6	6	4	4	4	-	4
619 WUHAN	4	4	6	4	6	6	6	6	4	4	6	6
599 XIXIAKOU	4	4	6	4	6	6	6	6	6	4	6	6

	494	509	562	603	660	699	700	754	757	576	507	360
	LOUGUANTA	LOUGUANTA	LOUGUANTA	LOUGUANTA	LOUGUANTA	LOUGUANTA	LOUGUANTA	LOUGUANTA	LOUGUANTA	MADRID Z	MEMPHIS	MEXICOCTY
Best →	4	2	1	3	1	1	1	1	1	2	1	1
605 XIXIAKOU	4	6	6	5	6	6	6	6	6	6	6	6
399 YAAN BC	4	6	6	-	6	6	6	6	6	6	6	6
413 YAAN BC	4	4	6	4	6	6	6	6	6	4	6	6
424 YAAN BC	4	4	4	4	6	6	6	6	4	4	6	6
488 YAAN BC	4	3	2	3	2	2	2	2	2	2	4	2
502 YAAN BC	6	3	1	4	1	1	1	1	1	2	1	1
503 YAAN BC	4	2	3	3	3	3	3	2	2	2	2	2
524 YAAN BC	4	4	6	4	6	6	6	6	6	4	6	6
542 YAAN BC	6	3	1	4	1	1	1	1	2	3	1	1
563 YAAN BC	4	3	4	4	4	4	4	4	4	3	4	4
620 YAAN BC	4	4	4	4	6	6	6	4	4	4	4	6
633 YAAN BC	4	4	4	4	6	6	6	6	4	4	6	6
636 YAAN BC	4	4	4	4	6	6	6	6	4	4	6	6
639 YAAN BC	4	4	4	4	6	6	6	6	4	4	6	6
661 YAAN BC	6	3	1	4	1	1	1	1	2	3	1	1
668 YAAN BC	4	4	6	4	6	6	6	6	6	4	6	6
689 YAAN BC	4	4	1	3	2	2	2	1	4	3	1	1
690 YAAN BC	4	4	1	3	2	2	2	1	4	3	1	1
696 YAAN BC	6	3	1	4	1	1	1	1	2	3	1	1
705 YAAN BC	4	-	4	4	6	6	6	4	4	4	4	4
707 YAAN BC	4	4	6	4	6	6	6	6	6	4	6	6
708 YAAN BC	4	4	6	4	6	6	6	6	6	4	6	6
714 YAAN BC	4	-	3	4	4	4	4	3	4	2	3	3
719 YAAN BC	4	3	1	3	2	2	2	1	2	3	1	2
721 YAAN BC	4	4	4	4	6	6	6	4	4	4	4	6
729 YAAN BC	6	3	1	4	1	1	1	1	1	2	1	1
742 YAAN BC	4	3	4	4	4	4	4	4	3	3	4	4
743 YAAN BC	4	-	1	4	1	1	1	1	4	3	1	1
744 YAAN BC	4	4	4	4	6	6	6	4	4	3	4	4
745 YAAN BC	4	3	4	4	4	4	4	4	3	3	4	4
746 YAAN BC	4	3	4	4	4	4	4	4	3	3	4	4
747 YAAN BC	4	2	3	3	3	3	3	3	3	2	3	3
748 YAAN BC	4	3	1	4	1	1	1	1	1	2	4	1
750 YAAN BC	4	4	6	4	6	6	6	6	4	4	6	6
752 YAAN BC	6	3	1	4	1	1	1	1	1	2	4	1
756 YAAN BC	4	2	3	4	3	3	3	2	3	2	2	3
758 YAAN BC	4	4	3	3	3	3	3	3	4	2	2	3
342 YANGZHOU	6	3	1	4	1	1	1	1	1	3	1	1

	643	651	473	600	601	611	618	416	371	596	694	587	514	521
	NANJING	NANJING	NZP-WASH	PANYU	PANYU	PANYU	PANYU	QINGDAO W	SANDIEGOZ	SANDIEGOZ	SANDIEGOZ	TAIPEI	VIENNA	WAKAYAMA
Best →	2	2	1	4	1	4	4	1	4	3	3	4	4	4
327 ABERDE HK	2	4	1	6	1	6	6	1	6	4	4	6	6	6
606 ABERDE HK	2	4	2	6	2	-	-	2	6	3	3	6	6	4
627 ANJI	6	4	6	-	6	5	4	6	5	4	4	-	5	-
629 ANJI	6	4	6	-	6	5	4	6	5	4	4	-	5	-
666 ANJI BAMB	6	4	6	-	6	5	5	6	5	4	4	-	4	4
461 ATLANTA	2	3	1	6	1	6	6	2	6	4	4	6	6	4
731 ATLANTA	2	4	4	6	2	6	4	2	6	3	3	6	6	4
394 BEIJING	6	5	6	5	6	-	5	6	-	-	-	5	-	5
496 BEIJING	6	4	6	5	6	6	4	6	-	5	5	5	5	4
674 BEIJING	4	4	1	6	-	6	6	1	6	4	4	6	6	6
688 BEIJING	6	4	6	5	6	4	4	6	6	4	4	6	5	4
454 CHENGDU	3	4	4	4	4	4	4	6	4	4	4	4	4	-
536 CHENGDU	3	4	4	4	4	4	4	4	4	4	4	4	4	-
377 CHENGDU B	2	3	3	6	3	6	4	3	6	3	3	6	6	4
386 CHENGDU B	2	3	1	6	1	6	6	2	6	4	4	6	6	4
455 CHENGDU B	6	4	6	-	6	5	5	6	-	5	5	-	5	5
529 CHENGDU B	4	4	4	4	4	4	4	6	4	4	4	4	4	-
540 CHENGDU B	4	4	4	4	4	4	4	4	4	4	4	4	4	-
573 CHENGDU B	4	4	4	4	3	4	4	4	6	4	4	4	4	-
574 CHENGDU B	4	4	4	4	3	4	4	4	6	4	4	4	4	-
575 CHENGDU B	3	4	4	4	4	4	4	6	4	4	4	4	4	-
584 CHENGDU B	2	4	3	4	3	4	4	3	6	4	4	4	4	4
630 CHENGDU B	6	4	6	-	6	5	4	6	5	4	4	-	5	-
644 CHENGDU B	6	4	6	-	6	5	4	6	5	4	4	-	5	5
646 CHENGDU B	6	4	6	-	6	4	4	6	5	4	4	-	4	4
670 CHENGDU B	6	4	6	-	6	4	4	6	5	4	4	-	4	4
711 CHENGDU B	2	2	3	4	3	4	4	4	6	4	4	4	4	4
717 CHENGDU B	4	4	6	5	6	5	5	6	5	4	4	5	4	4
718 CHENGDU B	4	4	6	5	6	5	5	6	5	4	4	5	4	4
724 CHENGDU B	2	3	2	6	1	6	6	2	6	3	3	6	6	4
726 CHENGDU B	3	2	3	4	3	4	4	4	6	4	4	4	4	4
727 CHENGDU B	4	4	6	5	6	4	4	6	5	4	4	5	4	5
732 CHENGDU B	3	4	4	4	4	4	4	6	4	4	4	4	4	-
736 CHENGDU B	2	3	3	4	3	6	4	3	6	4	4	4	4	4
510 CHIANGMAI	4	3	3	6	4	6	4	3	6	3	3	4	6	4
513 CHONGQING	4	4	6	-	6	5	4	6	-	4	4	4	-	4
676 CHONGQING	4	4	6	4	6	-	-	6	5	4	4	4	4	4
525 FUZHOU	4	4	6	4	6	5	4	6	-	4	4	4	-	4
532 FUZHOU	4	4	6	4	6	5	4	6	-	4	4	4	-	4
538 FUZHOU	6	4	6	5	6	6	4	6	-	5	5	5	5	4
518 GUANGZH Z	4	4	6	4	6	5	4	6	-	4	4	4	-	4
628 GUIZHOU W	6	4	6	-	6	5	4	6	5	4	4	-	5	-

	643	651	473	600	601	611	618	416	371	596	694	587	514	521
	NANJING	NANJING	NZP-WASH	PANYU	PANYU	PANYU	PANYU	QINGDAO W	SANDIEGOZ	SANDIEGOZ	SANDIEGOZ	TAIPEI	VIENNA	WAKAYAMA
Best →	2	2	1	4	1	4	4	1	4	3	3	4	4	4
564 HANDAN	4	4	6	5	6	4	4	6	-	4	4	5	5	4
530 HUAIAN	4	4	4	4	4	4	4	6	4	4	4	4	4	-
467 HUAINAN	3	4	4	4	4	4	4	4	4	4	4	4	4	-
433 KOBE PARK	4	4	6	5	6	4	4	6	-	4	4	5	5	4
592 LANZHOU	3	4	4	4	4	4	4	4	4	4	4	4	4	-
460 LOUGUANTA	6	4	6	5	6	5	5	6	-	-	-	5	-	4
624 LOUGUANTA	3	4	1	6	1	6	6	1	6	4	4	6	6	6
658 LOUGUANTA	3	4	1	6	1	6	6	1	6	4	4	6	6	6
697 LOUGUANTA	3	4	1	6	1	6	6	1	6	4	4	6	6	6
703 LOUGUANTA	3	4	1	6	1	6	6	1	6	4	4	6	6	6
713 LOUGUANTA	4	3	3	4	4	6	4	3	6	3	3	4	4	4
715 LOUGUANTA	3	4	4	4	4	4	4	4	4	4	4	4	4	4
753 LOUGUANTA	2	4	4	6	1	6	6	1	6	4	4	6	6	6
520 LUOYANG	2	2	3	4	3	4	4	4	6	4	4	4	4	-
519 MADRID Z	3	2	3	4	3	4	4	4	6	4	4	4	4	-
466 MEMPHIS	2	4	3	6	3	-	-	3	6	3	3	4	6	4
642 NANJING	-	4	3	6	4	6	4	3	6	3	3	4	6	4
458 NZP-WASH	6	4	6	5	6	4	4	6	-	5	5	5	5	4
595 NZP-WASH	3	4	-	4	4	4	4	4	5	4	4	4	4	4
609 PANYU	2	3	3	6	3	6	4	3	6	4	4	4	6	4
612 PANYU	6	4	6	4	6	-	-	6	5	4	4	4	5	4
613 PANYU	2	4	3	4	3	-	-	4	6	4	4	-	4	4
623 PANYU	3	4	1	6	1	6	6	1	6	4	4	6	6	6
415 SANDIEGOZ	2	4	1	6	1	6	6	1	6	-	-	6	6	6
749 SANDIEGOZ	3	4	4	4	4	4	4	4	-	-	-	4	5	4
357 SHANGHAI	2	4	1	6	1	6	6	1	6	4	4	6	6	6
492 SHANGHAI	4	4	-	5	6	4	4	6	-	4	4	5	5	4
582 SHANGHAIW	2	2	3	4	3	6	4	3	6	4	4	4	4	4
583 SHANGHAIW	6	4	6	4	6	-	-	6	5	4	4	4	5	4
586 SHANGHAIW	3	4	4	4	4	4	4	4	-	4	4	4	5	4
588 TAIPEI	4	4	6	4	6	-	-	6	-	4	4	4	4	4
589 TIANJIN	4	4	6	4	6	-	-	6	-	4	4	4	4	4
526 VIENNA	-	3	1	6	4	6	6	2	6	4	4	6	6	4
685 VIENNA	4	4	4	4	4	5	4	4	5	4	4	4	-	4
390 WAKAYAMA	4	4	3	4	3	6	4	3	6	3	3	4	6	4
614 WAKAYAMA	4	4	4	4	3	4	4	4	6	4	4	4	4	-
662 WAKAYAMA	4	4	4	4	3	4	4	4	6	4	4	4	4	-
738 WAKAYAMA	4	4	4	4	4	4	4	4	4	4	4	4	4	-
607 WUHAN	4	4	4	4	4	4	4	6	5	4	4	6	4	4
619 WUHAN	4	4	6	4	6	-	-	6	-	4	4	4	4	4
599 XIXIAKOU	4	4	6	-	6	4	4	6	5	4	4	-	-	4

	643	651	473	600	601	611	618	416	371	596	694	587	514	521
	NANJING	NANJING	NZP-WASH	PANYU	PANYU	PANYU	PANYU	QINGDAO W	SANDIEGOZ	SANDIEGOZ	SANDIEGOZ	TAIPEI	VIENNA	WAKAYAMA
Best →	2	2	1	4	1	4	4	1	4	3	3	4	4	4
605 XIXIAKOU	6	4	6	-	6	5	5	6	-	5	5	-	5	4
399 YAAN BC	6	4	6	5	6	5	5	6	-	-	-	5	-	4
413 YAAN BC	4	4	6	5	6	4	4	6	-	4	4	5	5	4
424 YAAN BC	4	-	4	4	6	-	-	6	5	4	4	4	4	4
488 YAAN BC	4	4	2	6	3	6	4	2	6	3	3	6	6	4
502 YAAN BC	4	3	1	6	-	6	6	1	6	4	4	6	6	4
503 YAAN BC	4	4	3	4	3	6	4	3	6	3	3	4	6	4
524 YAAN BC	4	4	6	4	6	5	4	6	-	4	4	4	-	4
542 YAAN BC	3	4	1	6	1	6	6	1	6	4	4	6	6	6
563 YAAN BC	3	4	4	4	4	4	4	4	-	-	-	4	5	4
620 YAAN BC	4	4	4	-	4	4	4	6	5	4	4	-	4	4
633 YAAN BC	4	4	4	4	4	6	4	6	5	4	4	4	5	4
636 YAAN BC	4	4	4	4	6	-	4	6	5	4	4	4	5	4
639 YAAN BC	4	4	4	4	6	4	4	6	5	4	4	6	4	4
661 YAAN BC	3	4	1	6	1	6	6	1	6	4	4	6	6	6
668 YAAN BC	4	4	6	4	6	4	-	6	-	4	4	4	5	4
689 YAAN BC	-	3	1	6	-	6	6	2	6	4	4	6	6	4
690 YAAN BC	-	3	1	6	-	6	6	2	6	4	4	6	6	4
696 YAAN BC	3	4	1	6	1	6	6	1	6	4	4	6	6	6
705 YAAN BC	4	4	4	4	-	4	4	6	5	4	4	4	5	4
707 YAAN BC	4	4	6	4	6	-	-	6	5	4	4	6	4	4
708 YAAN BC	4	4	6	4	6	-	-	6	5	4	4	6	4	4
714 YAAN BC	4	4	3	4	3	4	4	4	6	4	4	4	4	4
719 YAAN BC	2	4	1	6	1	-	-	2	6	4	4	6	6	4
721 YAAN BC	4	4	4	4	4	4	4	6	5	4	4	4	4	4
729 YAAN BC	4	4	1	6	1	6	6	1	6	4	4	6	6	4
742 YAAN BC	4	4	4	4	-	-	4	4	5	4	4	4	4	4
743 YAAN BC	3	3	1	6	1	6	6	1	6	4	4	6	6	4
744 YAAN BC	4	4	4	4	4	4	4	6	5	4	4	4	5	4
745 YAAN BC	4	4	4	4	4	4	4	4	5	4	4	4	4	4
746 YAAN BC	4	4	4	4	4	4	4	4	5	4	4	4	4	4
747 YAAN BC	4	-	4	4	3	6	4	3	6	4	4	4	4	4
748 YAAN BC	4	3	1	6	1	6	6	1	6	4	4	6	6	4
750 YAAN BC	4	4	6	4	6	4	4	6	-	4	4	4	5	4
752 YAAN BC	4	3	1	6	1	6	6	1	6	4	4	6	6	4
756 YAAN BC	4	4	3	-	3	6	4	3	6	4	4	4	-	4
758 YAAN BC	-	4	3	4	4	6	4	3	6	3	3	4	6	4
342 YANGZHOU	2	4	1	6	1	6	6	1	6	4	4	6	6	6

	663	737	382	418	432	437	439	474	476	477	487	495	505	511
	WAKAYAMA	WAKAYAMA	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC
Best →	2	3	1	2	4	4	1	2	4	4	4	2	1	4
327 ABERDE HK	4	4	1	4	6	6	1	3	6	6	6	2	1	6
606 ABERDE HK	3	3	2	3	6	6	3	2	6	6	4	2	2	6
627 ANJI	5	5	6	-	5	5	6	6	5	5	4	6	6	4
629 ANJI	5	5	6	-	5	5	6	6	5	5	4	6	6	4
666 ANJI BAMB	4	4	6	-	5	5	6	6	5	5	4	6	6	4
461 ATLANTA	3	3	1	3	6	6	1	3	6	6	4	2	2	6
731 ATLANTA	4	4	2	3	6	6	1	4	6	6	4	2	2	6
394 BEIJING	5	5	6	6	-	-	6	6	-	-	-	6	6	-
496 BEIJING	4	4	6	4	-	-	6	6	-	-	5	-	6	5
674 BEIJING	4	4	1	3	6	6	1	3	6	6	6	2	1	6
688 BEIJING	4	4	6	4	5	5	6	4	5	5	4	6	6	5
454 CHENGDU	4	4	4	4	4	4	4	4	4	4	4	3	6	4
536 CHENGDU	4	4	4	4	4	4	4	4	4	4	4	3	4	4
377 CHENGDU B	3	3	3	3	6	6	3	2	6	6	4	2	2	6
386 CHENGDU B	4	4	1	3	6	6	1	3	6	6	4	2	2	6
455 CHENGDU B	4	5	6	-	-	-	6	6	-	5	5	6	6	5
529 CHENGDU B	4	4	4	4	4	4	4	4	4	4	4	4	6	4
540 CHENGDU B	-	-	3	2	4	4	4	4	4	4	4	3	4	4
573 CHENGDU B	-	-	3	2	4	4	3	4	4	4	4	3	4	4
574 CHENGDU B	-	-	3	2	4	4	3	4	4	4	4	3	4	4
575 CHENGDU B	4	4	4	4	4	4	4	4	4	4	4	3	4	4
584 CHENGDU B	2	3	3	2	6	6	3	2	6	6	4	2	3	4
630 CHENGDU B	5	5	6	-	5	5	6	6	5	5	4	6	6	4
644 CHENGDU B	4	4	6	-	5	5	6	6	5	5	4	6	6	4
646 CHENGDU B	4	4	6	-	5	5	6	4	5	4	4	6	6	4
670 CHENGDU B	4	4	6	-	5	5	6	6	5	5	4	6	6	4
711 CHENGDU B	4	4	3	2	6	6	3	2	6	6	4	2	3	4
717 CHENGDU B	4	4	6	4	4	4	6	4	4	4	4	4	6	4
718 CHENGDU B	4	4	6	4	4	4	6	4	4	4	4	4	6	4
724 CHENGDU B	4	3	2	3	6	6	1	3	6	6	4	2	2	6
726 CHENGDU B	2	4	3	2	6	4	3	2	4	6	4	3	4	4
727 CHENGDU B	4	4	6	4	4	4	6	4	4	4	4	4	6	4
732 CHENGDU B	-	-	4	4	4	4	4	4	4	4	4	3	4	4
736 CHENGDU B	4	4	3	2	6	6	3	2	6	6	4	2	3	4
510 CHIANGMAI	3	3	3	-	6	6	-	2	6	6	4	-	3	4
513 CHONGQING	4	4	-	4	5	5	6	-	5	-	5	4	6	-
676 CHONGQING	4	4	6	4	4	4	6	4	4	4	4	4	6	4
525 FUZHOU	4	4	6	4	-	-	6	4	-	-	5	4	6	-
532 FUZHOU	4	4	6	4	5	5	6	4	5	-	5	4	6	-
538 FUZHOU	4	4	6	4	-	-	6	6	-	-	5	-	6	5
518 GUANGZH Z	4	4	6	4	5	5	-	4	5	-	5	4	6	-
628 GUIZHOU W	5	5	6	-	5	5	6	6	5	5	4	6	6	4

	663	737	382	418	432	437	439	474	476	477	487	495	505	511
	WAKAYAMA	WAKAYAMA	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC
Best →	2	3	1	2	4	4	1	2	4	4	4	2	1	4
564 HANDAN	4	4	6	4	-	-	6	4	-	5	5	4	6	-
530 HUAIAN	4	4	4	4	4	4	4	4	4	4	4	4	6	4
467 HUAINAN	4	4	4	4	4	4	4	3	4	4	4	3	4	4
433 KOBE PARK	4	4	6	4	-	-	-	4	-	5	5	4	6	5
592 LANZHOU	4	4	3	2	4	4	3	4	4	4	4	3	4	4
460 LOUGUANTA	4	4	6	4	-	-	6	6	-	-	-	6	6	-
624 LOUGUANTA	4	4	1	4	6	6	1	3	6	6	6	3	1	6
658 LOUGUANTA	4	4	1	4	6	6	1	3	6	6	6	2	1	6
697 LOUGUANTA	4	4	1	4	6	6	1	3	6	6	6	2	1	6
703 LOUGUANTA	4	4	1	4	6	6	1	3	6	6	6	3	1	6
713 LOUGUANTA	3	3	3	-	6	6	4	2	6	6	4	4	3	4
715 LOUGUANTA	4	4	4	4	4	4	4	3	4	4	4	3	4	4
753 LOUGUANTA	4	4	1	3	6	6	1	2	6	6	6	2	1	6
520 LUOYANG	2	4	3	2	6	6	3	2	6	6	4	2	3	4
519 MADRID Z	2	4	3	2	6	4	3	2	4	6	4	3	4	4
466 MEMPHIS	3	3	3	3	6	6	3	2	6	6	4	2	2	4
642 NANJING	4	4	3	3	6	6	4	2	6	6	4	-	2	6
458 NZP-WASH	4	4	6	4	-	-	6	4	-	5	5	6	6	5
595 NZP-WASH	4	4	4	4	-	-	4	4	-	4	4	3	4	4
609 PANYU	3	3	3	3	6	6	3	2	6	6	4	2	2	-
612 PANYU	4	4	6	4	4	4	6	4	4	-	4	6	6	5
613 PANYU	2	4	3	2	6	4	3	2	6	6	4	2	3	4
623 PANYU	4	4	1	4	6	6	1	3	6	6	6	3	1	6
415 SANDIEGOZ	4	4	1	3	6	6	1	3	6	6	6	2	1	6
749 SANDIEGOZ	4	4	4	4	5	5	4	3	5	5	-	3	4	4
357 SHANGHAI	4	4	1	4	6	6	1	3	6	6	6	2	1	6
492 SHANGHAI	4	4	6	4	-	-	6	4	-	5	5	4	6	5
582 SHANGHAIW	3	3	3	2	-	-	3	2	-	6	4	2	3	4
583 SHANGHAIW	4	4	6	4	4	4	6	4	4	-	4	6	6	5
586 SHANGHAIW	4	4	4	4	5	5	4	3	5	5	4	3	4	-
588 TAIPEI	4	4	6	4	4	4	6	4	4	4	-	4	6	4
589 TIANJIN	4	4	6	4	4	4	6	4	4	4	-	4	6	4
526 VIENNA	3	3	1	3	6	6	-	3	6	-	4	-	2	6
685 VIENNA	4	4	-	4	4	4	4	4	4	-	4	-	4	4
390 WAKAYAMA	-	-	3	3	6	6	3	2	6	6	4	2	3	4
614 WAKAYAMA	-	-	3	2	4	4	3	4	4	4	4	3	4	4
662 WAKAYAMA	-	-	3	2	4	4	3	4	4	4	4	3	4	4
738 WAKAYAMA	-	-	4	4	4	4	4	4	4	4	4	3	4	4
607 WUHAN	4	4	4	4	5	5	4	4	5	4	4	3	4	4
619 WUHAN	4	4	6	4	4	4	6	4	4	4	-	4	6	4
599 XIXIAKOU	4	4	-	-	5	5	6	-	5	4	4	4	6	4

	663	737	382	418	432	437	439	474	476	477	487	495	505	511
	WAKAYAMA	WAKAYAMA	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC
Best →	2	3	1	2	4	4	1	2	4	4	4	2	1	4
605 XIXIAKOU	4	4	6	-	-	-	6	6	-	5	5	6	6	5
399 YAAN BC	4	4	6	4	-	-	6	6	-	-	-	6	6	-
413 YAAN BC	4	4	6	4	-	-	-	4	-	5	5	4	6	5
424 YAAN BC	4	4	4	4	4	4	6	4	4	4	4	4	6	4
488 YAAN BC	-	-	2	3	6	6	3	2	6	6	4	2	2	6
502 YAAN BC	3	4	1	3	6	6	1	2	6	6	6	2	1	6
503 YAAN BC	3	3	3	3	6	6	3	2	6	6	4	2	3	4
524 YAAN BC	4	4	6	4	-	-	6	4	-	-	5	4	6	-
542 YAAN BC	4	4	1	4	6	6	1	3	6	6	6	3	1	6
563 YAAN BC	4	4	4	4	5	5	4	3	5	5	-	3	4	4
620 YAAN BC	4	4	4	-	5	5	4	4	5	4	4	4	6	4
633 YAAN BC	4	4	4	4	4	4	4	4	4	5	4	4	6	-
636 YAAN BC	4	4	4	4	4	4	4	4	4	-	4	4	6	5
639 YAAN BC	4	4	4	4	5	5	6	4	5	4	4	4	6	4
661 YAAN BC	4	4	1	4	6	6	1	3	6	6	6	3	1	6
668 YAAN BC	4	4	6	4	4	4	6	4	4	5	-	4	6	5
689 YAAN BC	3	4	1	3	6	6	4	3	6	6	6	-	1	6
690 YAAN BC	3	4	1	3	6	6	4	3	6	6	6	-	1	6
696 YAAN BC	4	4	1	4	6	6	1	3	6	6	6	3	1	6
705 YAAN BC	4	4	4	-	4	4	-	4	4	5	4	4	6	4
707 YAAN BC	4	4	6	4	5	5	6	4	5	4	4	6	6	4
708 YAAN BC	4	4	6	4	5	5	6	4	5	4	4	6	6	4
714 YAAN BC	2	4	3	-	6	4	3	2	6	6	4	3	3	4
719 YAAN BC	3	3	1	3	6	6	1	3	6	6	4	2	2	6
721 YAAN BC	4	4	4	4	-	-	4	4	-	4	4	4	6	4
729 YAAN BC	3	4	1	3	6	6	1	2	6	6	6	2	-	6
742 YAAN BC	4	4	4	4	4	4	4	3	4	-	4	4	4	4
743 YAAN BC	3	4	1	-	6	6	1	3	6	6	6	3	1	6
744 YAAN BC	4	4	4	4	4	4	4	4	4	5	4	3	4	-
745 YAAN BC	4	4	4	4	4	4	4	3	4	4	4	3	4	4
746 YAAN BC	4	4	4	4	4	4	4	3	4	4	4	3	4	4
747 YAAN BC	4	4	-	2	6	6	3	-	6	6	4	2	3	4
748 YAAN BC	4	4	1	3	6	6	1	3	6	6	6	2	1	6
750 YAAN BC	4	4	6	4	5	5	6	4	5	5	5	4	6	5
752 YAAN BC	4	4	1	3	6	6	1	2	6	6	6	2	1	6
756 YAAN BC	3	3	-	3	6	6	3	-	6	6	4	2	3	4
758 YAAN BC	3	3	3	2	6	6	4	2	6	6	4	-	3	4
342 YANGZHOU	4	4	1	4	6	6	1	3	6	6	6	2	1	6

	512	516	544	547	549	557	565	567	568	569	571	572	581	625
	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC
Best →	2	4	1	4	4	4	4	2	4	1	4	2	1	3
327 ABERDE HK	3	6	1	6	6	6	6	4	6	2	6	3	1	4
606 ABERDE HK	3	6	-	6	6	4	6	-	4	2	-	3	2	3
627 ANJI	6	5	6	5	5	4	5	4	4	6	5	4	6	6
629 ANJI	4	5	6	5	5	4	5	4	4	6	5	4	6	6
666 ANJI BAMB	4	5	6	4	4	4	5	4	4	6	5	4	6	5
461 ATLANTA	3	6	1	6	6	6	6	3	4	2	6	3	2	4
731 ATLANTA	3	6	2	6	6	6	6	3	4	2	6	3	2	3
394 BEIJING	6	-	6	-	-	-	-	5	-	6	-	-	6	5
496 BEIJING	4	-	6	5	5	-	-	4	5	6	6	6	6	4
674 BEIJING	3	6	-	6	6	6	6	3	6	1	6	3	1	4
688 BEIJING	4	-	6	5	-	4	5	4	6	6	4	4	6	4
454 CHENGDU	4	4	4	4	4	4	4	4	4	4	4	4	6	6
536 CHENGDU	2	4	4	4	4	4	4	4	4	3	4	4	4	4
377 CHENGDU B	3	6	2	6	6	4	6	3	4	2	6	3	2	3
386 CHENGDU B	3	6	2	6	6	6	6	3	4	2	6	3	2	3
455 CHENGDU B	6	-	6	5	5	5	-	4	5	6	5	6	6	-
529 CHENGDU B	4	4	6	4	4	4	4	4	4	4	4	4	6	4
540 CHENGDU B	2	4	4	4	4	4	4	4	4	6	4	2	4	4
573 CHENGDU B	2	4	4	4	4	4	4	2	4	6	4	2	4	4
574 CHENGDU B	2	4	4	4	4	4	4	2	4	6	4	2	4	4
575 CHENGDU B	4	4	4	4	4	4	4	4	4	4	4	4	4	6
584 CHENGDU B	2	6	3	4	4	4	4	4	4	3	4	2	3	3
630 CHENGDU B	4	5	6	5	5	4	5	4	4	6	5	4	6	6
644 CHENGDU B	4	5	6	4	4	4	5	4	4	6	5	4	6	6
646 CHENGDU B	4	5	6	4	4	4	5	4	4	6	4	4	6	4
670 CHENGDU B	4	5	6	4	4	4	5	4	4	6	4	4	6	6
711 CHENGDU B	2	6	3	4	4	4	4	2	4	3	4	2	3	4
717 CHENGDU B	4	4	6	4	4	4	4	4	4	4	5	4	6	4
718 CHENGDU B	4	4	6	4	4	4	4	4	4	4	5	4	6	4
724 CHENGDU B	3	6	2	6	6	6	6	3	4	2	6	3	2	4
726 CHENGDU B	2	6	3	4	4	4	4	2	4	3	4	2	4	4
727 CHENGDU B	4	4	6	4	4	4	4	4	4	6	4	4	6	4
732 CHENGDU B	4	4	4	4	4	4	4	4	4	4	4	4	4	4
736 CHENGDU B	2	6	3	4	4	4	4	2	4	3	6	2	3	4
510 CHIANGMAI	2	6	2	6	6	4	4	3	4	2	6	3	3	-
513 CHONGQING	4	5	6	-	-	5	5	-	5	6	5	4	6	4
676 CHONGQING	4	4	6	4	4	4	4	-	4	4	-	4	6	4
525 FUZHOU	6	5	6	-	-	5	5	4	5	6	5	4	6	4
532 FUZHOU	4	5	6	-	-	5	-	4	4	4	5	4	6	4
538 FUZHOU	4	-	6	5	5	-	-	4	5	6	6	6	6	4
518 GUANGZH Z	4	5	6	-	-	5	5	4	5	4	5	4	6	4
628 GUIZHOU W	6	5	6	5	5	4	5	4	4	6	5	4	6	6

	512	516	544	547	549	557	565	567	568	569	571	572	581	625
	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC
Best →	2	4	1	4	4	4	4	2	4	1	4	2	1	3
564 HANDAN	4	-	6	5	5	5	-	4	5	6	4	4	6	4
530 HUAIAN	4	4	6	4	4	4	4	4	4	4	4	4	6	4
467 HUAINAN	4	4	4	4	4	4	4	4	4	4	4	4	4	-
433 KOBE PARK	4	-	6	5	5	5	-	4	5	6	4	4	6	4
592 LANZHOU	2	4	4	4	4	4	4	2	4	3	4	2	4	-
460 LOUGUANTA	6	-	6	-	-	-	-	4	-	6	5	6	6	4
624 LOUGUANTA	4	6	1	6	6	6	6	4	6	2	6	4	1	4
658 LOUGUANTA	3	6	1	6	6	6	6	4	6	2	6	4	1	4
697 LOUGUANTA	3	6	1	6	6	6	6	4	6	2	6	4	1	4
703 LOUGUANTA	4	6	1	6	6	6	6	4	6	2	6	4	1	4
713 LOUGUANTA	2	6	3	4	4	4	4	3	4	3	6	2	3	4
715 LOUGUANTA	2	4	4	4	4	4	4	4	4	3	4	4	4	4
753 LOUGUANTA	3	6	1	6	6	6	6	3	6	1	6	3	1	4
520 LUOYANG	2	6	3	4	4	4	4	2	4	3	4	2	3	4
519 MADRID Z	2	6	3	4	4	4	4	2	4	3	4	2	4	4
466 MEMPHIS	2	6	2	6	6	4	6	-	4	2	-	3	2	3
642 NANJING	3	6	2	6	6	4	6	3	4	4	6	4	2	3
458 NZP-WASH	-	-	6	5	5	5	-	4	5	6	4	4	6	4
595 NZP-WASH	4	5	4	4	4	4	4	4	4	3	4	4	4	4
609 PANYU	4	6	2	6	6	4	6	3	4	2	6	-	2	3
612 PANYU	4	4	6	5	5	6	4	-	4	6	-	-	6	4
613 PANYU	2	-	3	4	-	4	4	-	-	3	-	2	3	4
623 PANYU	4	6	1	6	6	6	6	4	6	2	6	4	1	4
415 SANDIEGOZ	3	6	1	6	6	6	6	4	6	1	6	3	1	4
749 SANDIEGOZ	4	5	4	4	4	4	4	4	4	3	4	4	4	4
357 SHANGHAI	3	6	1	6	6	6	6	4	6	2	6	-	1	4
492 SHANGHAI	4	-	6	5	5	5	-	4	5	6	4	4	6	4
582 SHANGHAIW	4	6	3	4	4	4	4	2	4	3	6	4	3	3
583 SHANGHAIW	4	4	6	5	5	6	4	-	4	6	-	-	6	4
586 SHANGHAIW	4	5	4	5	4	-	-	4	-	4	4	4	4	4
588 TAIPEI	4	4	6	4	4	4	4	-	4	4	-	4	6	4
589 TIANJIN	4	4	6	4	4	4	4	-	4	4	-	4	6	4
526 VIENNA	3	6	1	6	6	-	6	3	4	2	6	4	2	3
685 VIENNA	4	4	4	-	4	6	4	4	4	3	5	4	4	4
390 WAKAYAMA	2	6	2	6	4	4	4	3	4	-	6	2	3	3
614 WAKAYAMA	2	4	4	4	4	4	4	2	4	6	4	2	4	4
662 WAKAYAMA	2	4	4	4	4	4	4	2	4	6	4	2	4	4
738 WAKAYAMA	4	4	4	4	4	4	4	4	4	6	4	4	4	4
607 WUHAN	4	-	4	4	6	4	5	4	6	-	4	4	4	4
619 WUHAN	4	4	6	4	4	4	4	-	4	4	-	4	6	4
599 XIXIAKOU	4	5	6	-	4	4	5	-	4	6	4	4	6	4

	512 YAAN BC	516 YAAN BC	544 YAAN BC	547 YAAN BC	549 YAAN BC	557 YAAN BC	565 YAAN BC	567 YAAN BC	568 YAAN BC	569 YAAN BC	571 YAAN BC	572 YAAN BC	581 YAAN BC	625 YAAN BC
Best →	2	4	1	4	4	4	4	2	4	1	4	2	1	3
605 XIXIAKOU	-	-	6	5	5	5	-	4	5	6	5	6	6	5
399 YAAN BC	6	-	6	-	-	-	-	4	-	6	5	6	6	4
413 YAAN BC	4	-	6	5	5	5	-	4	5	6	4	4	6	4
424 YAAN BC	4	4	6	4	4	4	4	-	4	4	-	4	6	4
488 YAAN BC	3	6	2	6	6	4	6	3	4	-	6	3	2	3
502 YAAN BC	3	6	1	6	6	6	6	3	6	1	6	3	1	4
503 YAAN BC	2	6	2	6	6	4	4	3	4	2	6	2	3	3
524 YAAN BC	6	5	6	-	-	5	5	4	5	6	5	4	6	4
542 YAAN BC	4	6	1	6	6	6	6	4	6	2	6	4	1	4
563 YAAN BC	4	5	4	5	4	4	4	4	4	4	4	4	4	4
620 YAAN BC	4	5	4	4	4	4	5	4	4	4	4	4	6	4
633 YAAN BC	4	4	6	5	5	4	6	4	4	4	6	4	6	4
636 YAAN BC	4	4	6	5	5	6	4	4	4	4	-	-	6	4
639 YAAN BC	4	-	6	4	6	4	5	4	6	4	4	4	6	4
661 YAAN BC	4	6	1	6	6	6	6	4	6	2	6	4	1	4
668 YAAN BC	4	4	6	5	5	4	4	4	4	4	4	4	6	4
689 YAAN BC	3	6	1	6	6	6	6	3	4	2	6	4	1	4
690 YAAN BC	3	6	1	6	6	6	6	3	4	2	6	4	1	4
696 YAAN BC	4	6	1	6	6	6	6	4	6	2	6	4	1	4
705 YAAN BC	4	4	4	5	5	4	4	4	4	4	4	4	6	4
707 YAAN BC	4	-	6	4	6	4	5	-	6	6	-	4	6	4
708 YAAN BC	4	-	6	4	6	4	5	-	6	6	-	4	6	4
714 YAAN BC	2	6	3	4	4	4	4	2	4	3	4	2	3	-
719 YAAN BC	3	6	2	6	6	6	6	-	4	2	-	3	-	3
721 YAAN BC	-	5	6	4	4	4	5	4	4	4	4	4	6	4
729 YAAN BC	3	6	1	6	6	6	6	3	6	1	6	3	1	4
742 YAAN BC	4	4	4	4	4	6	4	4	4	3	-	-	4	4
743 YAAN BC	3	6	1	6	6	6	6	3	6	1	6	3	1	-
744 YAAN BC	4	4	4	5	5	4	6	4	4	4	4	4	4	4
745 YAAN BC	4	6	4	4	6	4	4	4	-	3	4	4	4	4
746 YAAN BC	4	6	4	4	6	4	4	4	-	3	4	4	4	4
747 YAAN BC	2	6	3	4	4	4	4	4	4	3	6	2	3	3
748 YAAN BC	3	6	-	6	6	6	6	3	6	6	6	3	1	4
750 YAAN BC	4	5	6	5	5	-	5	4	-	-	4	4	6	4
752 YAAN BC	3	6	1	6	6	6	6	3	6	6	6	3	1	4
756 YAAN BC	2	6	3	-	4	4	4	-	4	2	6	2	3	3
758 YAAN BC	2	6	3	4	4	4	4	3	4	2	6	4	3	3
342 YANGZHOU	3	6	1	6	6	6	6	4	6	2	6	3	1	4

	632	638	641	654	656	664	672	682	692	698	701	702	704	706
	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC
Best →	3	4	4	1	1	4	4	4	1	1	1	1	4	3
327 ABERDE HK	4	6	4	2	1	6	4	6	2	1	1	1	4	4
606 ABERDE HK	3	4	4	4	2	4	4	6	2	2	2	2	4	4
627 ANJI	4	4	4	6	6	4	4	4	6	6	6	6	4	4
629 ANJI	4	4	4	6	6	4	4	4	6	6	6	6	4	4
666 ANJI BAMB	4	4	4	6	6	4	4	4	6	6	6	6	4	5
461 ATLANTA	4	4	4	2	2	4	4	6	2	2	2	2	4	4
731 ATLANTA	4	4	4	2	2	4	4	6	4	2	2	2	4	3
394 BEIJING	5	5	5	6	6	-	5	-	6	6	6	6	-	5
496 BEIJING	5	5	5	6	6	4	5	6	6	6	6	6	4	4
674 BEIJING	4	6	4	2	1	4	4	6	-	1	1	1	4	4
688 BEIJING	4	-	5	6	6	5	4	5	6	6	6	6	5	4
454 CHENGDU	4	4	4	4	6	4	4	4	4	6	6	6	4	4
536 CHENGDU	4	4	4	3	4	4	4	4	4	4	4	4	4	4
377 CHENGDU B	3	4	4	2	2	4	4	6	2	3	3	3	4	3
386 CHENGDU B	4	4	4	2	2	4	4	6	2	2	2	2	4	3
455 CHENGDU B	5	5	5	6	6	6	5	5	6	6	6	6	6	5
529 CHENGDU B	4	4	4	4	6	4	4	4	4	6	6	6	4	4
540 CHENGDU B	4	4	4	3	4	4	4	4	4	4	4	4	4	4
573 CHENGDU B	4	4	4	3	4	4	4	4	4	4	4	4	4	4
574 CHENGDU B	4	4	4	3	4	4	4	4	4	4	4	4	4	4
575 CHENGDU B	4	4	4	4	4	4	4	4	4	6	6	6	4	4
584 CHENGDU B	4	4	4	4	3	4	4	4	3	3	3	3	4	4
630 CHENGDU B	4	4	4	6	6	4	4	4	6	6	6	6	4	4
644 CHENGDU B	4	4	4	6	6	4	4	4	6	6	6	6	4	4
646 CHENGDU B	4	4	4	6	6	4	4	4	6	6	6	6	4	4
670 CHENGDU B	4	4	4	6	6	4	4	4	6	6	6	6	4	4
711 CHENGDU B	4	4	4	3	3	4	4	4	3	4	4	4	4	4
717 CHENGDU B	4	4	4	4	6	4	4	4	4	6	6	6	4	4
718 CHENGDU B	4	4	4	4	6	4	4	4	4	6	6	6	4	4
724 CHENGDU B	4	4	4	2	2	4	4	6	2	2	2	2	4	3
726 CHENGDU B	4	4	4	3	4	4	4	4	3	4	4	4	4	4
727 CHENGDU B	4	4	4	6	6	4	4	4	6	6	6	6	4	4
732 CHENGDU B	4	4	4	4	4	4	4	4	4	6	6	6	4	4
736 CHENGDU B	4	4	4	3	3	4	4	4	3	3	3	3	4	3
510 CHIANGMAI	3	4	4	4	3	4	4	4	2	3	3	3	-	4
513 CHONGQING	4	4	4	6	6	5	4	5	6	6	6	6	5	-
676 CHONGQING	4	4	4	4	6	4	4	5	4	6	6	6	4	4
525 FUZHOU	6	4	6	6	6	5	6	5	6	6	6	6	5	4
532 FUZHOU	4	4	4	4	6	4	4	5	4	6	6	6	4	4
538 FUZHOU	5	5	5	6	6	4	5	6	6	6	6	6	4	4
518 GUANGZH Z	4	4	4	4	6	5	4	5	6	6	6	6	-	4
628 GUIZHOU W	4	4	4	6	6	4	4	4	6	6	6	6	4	4

	632 YAAN BC	638 YAAN BC	641 YAAN BC	654 YAAN BC	656 YAAN BC	664 YAAN BC	672 YAAN BC	682 YAAN BC	692 YAAN BC	698 YAAN BC	701 YAAN BC	702 YAAN BC	704 YAAN BC	706 YAAN BC
Best →	3	4	4	1	1	4	4	4	1	1	1	1	4	3
564 HANDAN	4	5	5	6	6	4	5	4	6	6	6	6	4	4
530 HUAIAN	4	4	4	4	6	4	4	4	4	6	6	6	4	4
467 HUAINAN	4	4	4	3	4	4	4	4	4	4	4	4	4	4
433 KOBE PARK	4	5	5	6	6	4	5	4	6	6	6	6	6	4
592 LANZHOU	4	4	4	3	4	4	4	4	4	4	4	4	4	4
460 LOUGUANTA	5	5	5	6	6	5	5	5	6	6	6	6	5	4
624 LOUGUANTA	6	6	6	2	1	6	6	6	2	1	1	1	6	4
658 LOUGUANTA	4	6	6	2	1	6	6	6	2	1	1	1	4	4
697 LOUGUANTA	4	6	6	2	1	6	6	6	2	1	1	1	4	4
703 LOUGUANTA	6	6	6	2	1	6	6	6	2	1	1	1	6	4
713 LOUGUANTA	4	4	4	2	3	4	4	4	3	3	3	3	4	4
715 LOUGUANTA	4	4	4	3	4	4	4	4	3	4	4	4	4	4
753 LOUGUANTA	4	6	4	1	1	4	4	6	1	1	1	1	4	4
520 LUOYANG	4	4	4	3	3	4	4	4	3	4	4	4	4	4
519 MADRID Z	4	4	4	3	4	4	4	4	3	4	4	4	4	4
466 MEMPHIS	3	4	4	4	2	4	4	4	2	3	3	3	4	4
642 NANJING	4	4	4	4	2	4	4	6	4	3	3	3	4	3
458 NZP-WASH	-	5	-	6	6	4	-	4	6	6	6	6	4	4
595 NZP-WASH	4	4	4	3	4	4	4	4	4	4	4	4	4	4
609 PANYU	4	4	4	2	2	4	4	6	2	3	3	3	4	4
612 PANYU	4	4	4	6	6	4	4	-	6	6	6	6	4	5
613 PANYU	4	4	4	4	3	4	4	4	3	4	4	4	4	4
623 PANYU	6	6	6	2	1	6	6	6	2	1	1	1	6	4
415 SANDIEGOZ	4	6	4	2	1	4	4	6	1	1	1	1	4	4
749 SANDIEGOZ	4	4	4	3	4	4	4	4	4	4	4	4	4	4
357 SHANGHAI	4	6	4	2	1	6	4	6	1	1	1	1	4	4
492 SHANGHAI	4	5	5	4	6	4	5	4	6	6	6	6	4	4
582 SHANGHAIW	-	4	4	3	3	4	4	4	3	3	3	3	4	3
583 SHANGHAIW	4	4	4	6	6	4	4	-	6	6	6	6	4	5
586 SHANGHAIW	4	4	4	4	4	4	4	4	4	4	4	4	4	4
588 TAIPEI	4	4	4	4	6	4	4	5	4	6	6	6	4	4
589 TIANJIN	4	4	4	4	6	4	4	5	4	6	6	6	4	4
526 VIENNA	4	4	4	2	2	4	4	6	2	2	2	2	4	4
685 VIENNA	4	4	4	3	4	4	4	4	4	4	4	4	4	4
390 WAKAYAMA	4	4	4	4	3	-	-	4	3	3	3	3	4	3
614 WAKAYAMA	4	4	4	3	4	4	4	4	4	4	4	4	4	4
662 WAKAYAMA	4	4	4	3	4	4	4	4	4	4	4	4	4	4
738 WAKAYAMA	4	4	4	3	4	4	4	4	4	4	4	4	4	4
607 WUHAN	6	-	4	4	4	4	4	4	4	6	6	6	4	4
619 WUHAN	4	4	4	4	6	4	4	5	4	6	6	6	4	4
599 XIXIAKOU	4	4	4	6	6	4	4	4	6	6	6	6	4	-

	632 YAAN BC	638 YAAN BC	641 YAAN BC	654 YAAN BC	656 YAAN BC	664 YAAN BC	672 YAAN BC	682 YAAN BC	692 YAAN BC	698 YAAN BC	701 YAAN BC	702 YAAN BC	704 YAAN BC	706 YAAN BC
Best →	3	4	4	1	1	4	4	4	1	1	1	1	4	3
605 XIXIAKOU	6	5	-	6	6	5	6	5	6	6	6	6	5	4
399 YAAN BC	5	5	5	6	6	5	5	5	6	6	6	6	5	4
413 YAAN BC	4	5	5	6	6	4	5	4	6	6	6	6	6	4
424 YAAN BC	4	4	4	-	6	4	4	-	4	6	6	6	4	-
488 YAAN BC	4	4	4	4	2	-	-	6	2	2	2	2	4	3
502 YAAN BC	-	6	-	1	1	4	4	6	-	1	1	1	4	4
503 YAAN BC	3	-	-	2	3	4	4	-	2	3	3	3	4	3
524 YAAN BC	6	4	6	6	6	5	6	5	6	6	6	6	5	4
542 YAAN BC	6	6	6	2	1	6	6	6	2	1	1	1	6	4
563 YAAN BC	4	4	4	3	4	4	4	4	4	4	4	4	4	4
620 YAAN BC	4	4	4	-	6	4	4	4	4	6	6	6	4	4
633 YAAN BC	4	4	4	4	6	4	4	5	4	6	6	6	4	4
636 YAAN BC	4	4	4	4	6	4	4	-	4	6	6	6	4	4
639 YAAN BC	4	-	6	4	6	4	4	5	4	6	6	6	4	4
661 YAAN BC	6	6	6	2	1	6	6	6	2	1	1	1	6	4
668 YAAN BC	4	5	4	4	6	5	4	5	6	6	6	6	4	4
689 YAAN BC	4	6	4	2	1	4	4	6	-	2	2	2	4	4
690 YAAN BC	4	6	4	2	1	4	4	6	-	2	2	2	4	4
696 YAAN BC	6	6	6	2	1	6	6	6	2	1	1	1	6	4
705 YAAN BC	4	4	4	4	6	-	4	4	4	6	6	6	-	4
707 YAAN BC	4	-	4	6	6	4	4	5	6	6	6	6	4	5
708 YAAN BC	4	-	4	6	6	4	4	5	6	6	6	6	4	5
714 YAAN BC	4	-	4	4	3	4	4	4	3	4	4	4	4	4
719 YAAN BC	4	4	4	4	2	4	4	6	2	2	2	2	4	4
721 YAAN BC	6	6	-	4	6	4	4	4	4	6	6	6	4	4
729 YAAN BC	4	-	4	1	1	4	4	6	1	1	1	1	4	4
742 YAAN BC	4	4	4	3	4	4	4	-	-	4	4	4	4	4
743 YAAN BC	4	6	4	4	1	4	4	6	1	1	1	1	4	4
744 YAAN BC	4	-	4	4	4	4	4	6	4	6	6	6	4	4
745 YAAN BC	4	-	4	3	4	4	4	4	3	4	4	4	4	4
746 YAAN BC	4	-	4	3	4	4	4	4	3	4	4	4	4	4
747 YAAN BC	4	-	4	3	3	4	4	4	-	3	3	3	4	4
748 YAAN BC	4	6	4	2	1	4	-	6	1	1	1	1	4	4
750 YAAN BC	4	4	4	4	6	4	4	4	6	6	6	6	4	4
752 YAAN BC	4	6	4	2	-	4	-	6	1	1	1	1	4	4
756 YAAN BC	3	4	4	2	3	4	4	4	4	3	3	3	4	-
758 YAAN BC	4	-	4	2	3	4	4	6	3	3	3	3	4	3
342 YANGZHOU	4	6	4	2	1	6	4	6	1	1	1	1	4	4

	712	734	735	739	741	751	755	759	760	631	634	650
	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YUNNAN W	YUNNAN W	YUNNAN W
Best →	2	4	4	1	3	4	2	1	1	3	4	2
327 ABERDE HK	3	6	6	1	4	6	3	2	2	4	6	4
606 ABERDE HK	3	4	4	2	4	6	3	2	2	3	4	4
627 ANJI	5	4	4	6	4	4	6	6	6	4	4	4
629 ANJI	5	4	4	6	4	4	6	6	6	4	4	4
666 ANJI BAMB	4	4	4	6	4	4	4	6	6	4	4	4
461 ATLANTA	3	6	6	2	4	6	3	2	2	4	4	3
731 ATLANTA	3	4	4	2	3	6	3	2	2	4	4	4
394 BEIJING	6	-	-	6	5	-	6	6	6	5	-	5
496 BEIJING	4	4	4	6	4	5	4	6	6	5	4	4
674 BEIJING	3	6	6	-	4	6	4	2	2	4	4	4
688 BEIJING	6	5	5	6	4	4	4	6	6	4	4	4
454 CHENGDU	4	4	4	4	4	4	4	4	4	4	4	4
536 CHENGDU	4	4	4	3	4	4	2	3	3	4	4	4
377 CHENGDU B	3	4	4	2	3	4	3	2	2	3	4	3
386 CHENGDU B	3	4	4	2	4	6	3	2	2	4	4	3
455 CHENGDU B	-	5	5	6	5	5	6	6	6	5	5	4
529 CHENGDU B	4	4	4	4	4	4	4	4	4	4	4	4
540 CHENGDU B	2	4	4	3	4	4	2	3	3	4	4	4
573 CHENGDU B	2	4	4	3	4	4	2	3	3	4	4	4
574 CHENGDU B	2	4	4	3	4	4	2	3	3	4	4	4
575 CHENGDU B	4	4	4	4	4	4	4	4	4	4	4	4
584 CHENGDU B	2	4	4	3	4	4	2	3	3	4	4	4
630 CHENGDU B	5	4	4	6	4	4	6	6	6	4	4	4
644 CHENGDU B	5	4	4	6	4	4	4	6	6	4	4	4
646 CHENGDU B	4	4	4	6	4	4	4	6	6	4	4	4
670 CHENGDU B	4	4	4	6	4	4	4	6	6	4	4	4
711 CHENGDU B	2	4	4	3	4	4	2	3	3	4	4	2
717 CHENGDU B	4	4	4	4	4	4	4	4	4	4	4	4
718 CHENGDU B	4	4	4	4	4	4	4	4	4	4	4	4
724 CHENGDU B	3	4	4	2	4	6	3	2	2	4	4	3
726 CHENGDU B	2	4	4	3	4	4	2	3	3	4	4	2
727 CHENGDU B	4	4	4	6	4	4	4	6	6	4	4	4
732 CHENGDU B	4	4	4	4	4	4	4	4	4	4	4	4
736 CHENGDU B	2	4	4	3	4	4	2	2	2	4	4	3
510 CHIANGMAI	-	4	4	4	3	4	2	4	4	3	4	3
513 CHONGQING	4	5	5	6	4	5	4	6	6	4	5	4
676 CHONGQING	4	5	5	4	4	4	4	4	4	4	4	4
525 FUZHOU	4	5	5	6	4	5	4	6	6	6	5	4
532 FUZHOU	4	5	5	4	4	5	4	4	4	4	-	4
538 FUZHOU	4	4	4	6	4	5	4	6	6	5	4	4
518 GUANGZH Z	4	5	5	6	4	5	4	4	4	4	5	4
628 GUIZHOU W	5	4	4	6	4	4	6	6	6	4	4	4

	712	734	735	739	741	751	755	759	760	631	634	650
	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YUNNAN W	YUNNAN W	YUNNAN W
Best →	2	4	4	1	3	4	2	1	1	3	4	2
564 HANDAN	4	4	4	6	4	5	4	6	6	4	6	4
530 HUAIAN	4	4	4	4	4	4	4	4	4	4	4	4
467 HUAINAN	4	4	4	4	4	4	4	3	3	4	4	4
433 KOBE PARK	4	4	4	6	4	5	4	4	4	4	4	4
592 LANZHOU	2	4	4	3	4	4	2	3	3	4	4	4
460 LOUGUANTA	6	5	5	6	5	-	6	6	6	5	5	4
624 LOUGUANTA	4	6	6	2	4	6	4	2	2	6	6	4
658 LOUGUANTA	4	6	6	1	4	6	3	2	2	4	6	4
697 LOUGUANTA	4	6	6	1	4	6	3	2	2	4	6	4
703 LOUGUANTA	4	6	6	2	4	6	4	2	2	6	6	4
713 LOUGUANTA	4	4	4	4	4	4	2	4	4	4	4	3
715 LOUGUANTA	4	4	4	3	4	4	3	3	3	4	4	4
753 LOUGUANTA	3	6	6	1	4	6	3	2	2	4	4	4
520 LUOYANG	2	4	4	3	4	4	2	3	3	4	4	2
519 MADRID Z	2	4	4	3	4	4	2	3	3	4	4	2
466 MEMPHIS	3	4	4	3	4	4	2	2	2	3	4	4
642 NANJING	4	4	4	-	4	4	4	4	4	4	4	4
458 NZP-WASH	4	4	4	6	4	5	4	6	6	-	4	4
595 NZP-WASH	4	4	4	4	4	4	4	3	3	4	4	4
609 PANYU	3	4	4	2	4	4	2	2	2	4	-	3
612 PANYU	4	6	6	6	5	4	4	6	6	4	6	4
613 PANYU	2	-	-	3	4	4	2	3	3	4	4	4
623 PANYU	4	6	6	2	4	6	4	2	2	6	6	4
415 SANDIEGOZ	3	6	6	1	4	6	3	2	2	4	6	4
749 SANDIEGOZ	4	4	4	4	4	4	4	3	3	4	4	4
357 SHANGHAI	3	6	6	1	4	6	3	2	2	4	6	4
492 SHANGHAI	4	4	4	6	4	5	4	4	4	4	4	4
582 SHANGHAIW	2	4	4	3	4	4	4	3	3	-	4	2
583 SHANGHAIW	4	6	6	6	5	4	4	6	6	4	6	4
586 SHANGHAIW	4	4	4	4	4	-	4	3	3	4	6	4
588 TAIPEI	4	5	5	6	-	4	4	4	4	4	4	4
589 TIANJIN	4	5	5	6	-	4	4	4	4	4	4	4
526 VIENNA	3	6	6	-	4	6	3	4	4	4	4	3
685 VIENNA	4	4	4	4	4	4	4	4	4	4	4	4
390 WAKAYAMA	2	4	4	3	3	6	2	2	2	4	4	4
614 WAKAYAMA	2	4	4	3	4	4	2	3	3	4	4	4
662 WAKAYAMA	2	4	4	3	4	4	2	3	3	4	4	4
738 WAKAYAMA	4	4	4	3	4	4	3	3	3	4	4	4
607 WUHAN	4	4	4	4	4	6	4	4	4	6	4	4
619 WUHAN	4	5	5	6	-	4	4	4	4	4	4	4
599 XIXIAKOU	4	4	4	6	4	4	4	6	6	4	4	4

	712	734	735	739	741	751	755	759	760	631	634	650
	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YAAN BC	YUNNAN W	YUNNAN W	YUNNAN W
Best →	2	4	4	1	3	4	2	1	1	3	4	2
605 XIXIAKOU	6	5	5	6	4	5	6	6	6	6	4	4
399 YAAN BC	6	5	5	6	5	-	6	6	6	5	5	4
413 YAAN BC	4	4	4	6	4	5	4	4	4	4	4	4
424 YAAN BC	4	-	-	4	-	4	4	4	4	4	-	-
488 YAAN BC	3	-	-	2	3	6	3	2	2	4	4	4
502 YAAN BC	3	6	6	-	-	6	-	1	1	-	4	3
503 YAAN BC	-	4	4	3	3	4	-	-	-	3	4	4
524 YAAN BC	4	5	5	6	4	5	4	6	6	6	5	4
542 YAAN BC	4	6	6	2	4	6	4	2	2	6	6	4
563 YAAN BC	4	4	4	4	4	4	4	3	3	4	4	4
620 YAAN BC	4	4	4	4	4	4	4	4	4	4	4	4
633 YAAN BC	4	4	4	4	4	5	4	4	4	4	-	4
636 YAAN BC	4	4	4	4	4	5	4	4	4	4	4	4
639 YAAN BC	-	4	4	4	4	4	4	-	-	4	4	4
661 YAAN BC	4	6	6	2	4	6	4	2	2	6	6	4
668 YAAN BC	6	4	4	6	-	4	4	4	4	4	4	4
689 YAAN BC	3	6	6	-	4	6	4	4	4	4	4	3
690 YAAN BC	3	6	6	-	4	6	4	4	4	4	4	3
696 YAAN BC	4	6	6	2	4	6	4	2	2	6	6	4
705 YAAN BC	4	4	4	4	4	4	4	-	-	4	4	4
707 YAAN BC	4	6	6	6	5	4	4	6	6	4	5	4
708 YAAN BC	4	6	6	6	5	4	4	6	6	4	5	4
714 YAAN BC	-	4	4	3	4	4	4	-	-	4	4	4
719 YAAN BC	3	4	4	2	4	6	3	2	2	4	4	4
721 YAAN BC	4	4	4	4	4	4	-	4	4	6	4	4
729 YAAN BC	-	6	6	1	4	6	4	-	-	4	4	4
742 YAAN BC	4	4	4	-	4	4	4	3	3	4	4	4
743 YAAN BC	-	6	6	1	4	6	3	1	1	4	4	3
744 YAAN BC	-	4	4	4	4	4	4	-	-	4	-	4
745 YAAN BC	-	4	4	4	4	4	4	-	-	4	4	4
746 YAAN BC	-	4	4	4	4	4	4	-	-	4	4	4
747 YAAN BC	-	4	4	3	4	4	4	-	-	4	4	-
748 YAAN BC	3	6	6	1	4	6	3	1	1	4	4	3
750 YAAN BC	4	5	5	6	4	-	4	4	4	4	5	4
752 YAAN BC	3	6	6	1	4	6	3	1	1	4	4	3
756 YAAN BC	4	4	4	3	4	4	4	4	4	3	4	4
758 YAAN BC	-	4	4	-	3	4	4	-	-	4	4	4
342 YANGZHOU	3	6	6	1	4	6	3	2	2	4	6	4