**Table 12.1. Field studies of odd-nosed monkeys**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Species** | **Site** | **Principal investigator(s) 1** | **Years** | **Study duration (months)** | **Contact hours** |
| *Rhinopithecus bieti* | Xiaochangdu, Tibet/China | Xiang Zuofu | 2003-2005 | 13 | 549 |
| Wuyapiya/Nanren, Yunnan, China | Craig Kirkpatrick | 1992-1994 | 9 | 394 |
| Cui Liangwei | 2000-2001 | 9 |  |
| Samage, Yunnan, China | Cyril Grueter, Li Dayong | 2005-2007 | 20 | 456 |
| Shiba, Yunnan, China | Wan Yi | 2008-2010 | ~14 |  |
| Tacheng, Yunnan, China | Ding Wei | 1999-2001 | ~12 | 520 |
| Li Dayong | 2008-2009 | 12 | 1609 |
| Ren Baoping et al. | 2009-ongoing |  |  |
| Jinsichang, Yunnan, China | Yang Shijian | 1997-1998 | 5 |  |
| Ren Baoping | 2003-2004 | 11 |  |
| Fuhe, Yunnan, China | Liu Zehua | 2000-2002 |  | 384 |
| Lasha, Yunnan, China | Huang Zhipang | 2008-2010 | ~21 | 846 |
| Longma, Yunnan, China | Huo Sheng | 2002-2004 | 14 |  |
| *Rhinopithecus roxellana* | Baihe, Sichuan, China | Craig Kirkpatrick | 1996-1998 | 18 | 721 |
| Alicia Krzton | 2014-2015 |  |  |
| Yuan-meng-ran Chu | 2011-2012 | 14 |  |
| Foping/Guanyinshan, Shaanxi, China | Zhao Haitao et al. | 2013-ongoing |  |  |
| Zhouzhi East, Shaanxi, China | Guo Songtao, Chia Tan | 2001-2003 | >10 | 560 |
| Zhouzhi West/Yuhuangmiao, Shaanxi, China | Li Baoguo, Zhao Dapeng, Zhang Peng, Qi Xiaoguang et al. | 1989-ongoing (more intensively after 1995, provisioned since 2001) |  |  |
| Qianjiaping/Shennongjia, Hubei, China | Li Yiming | 1998-2004 | >22 | >1150 |
| Liu Xuecong | 2006-2009 | ~25 |  |
| Dalongtan/Shennongjia, Hubei, China | Ren Renmei, Su Yanjie, Yan Kanghui | 1991-1999 |  | 1681 |
| Xiang Zuofu et al. (also Hui Yao et al.) | 2006-ongoing |  |  |
| Qingmuchuan, Shaanxi, China | Li Yankuo | 2006-2007 | 5 | 600 |
| Laohegou, Sichuan, China | Gu Fang et al. | 2013-2015 | 4 |  |
| *Rhinopithecus brelichi* | Fanjingshan, Guizhou, China | Bill Bleisch | 1991-1992 | 25 | >400 |
| Yang Yeqin et al. | 1987-2005 intermittently | 33 |  |
| Niu Kefeng, Chia Tan | 2008-2009 | 14 |  |
| Nie Shuaiguo, Xiang Zuofu | 2006-2008 |  | 210 |
|  | Guo Yanqing | 2011-2013 | 24 | (~1080) |
| *Rhinopithecus avunculus* | Khau Ca, Ha Giang, Vietnam | Dong Thanh Hai | 2005-2006 | 13 | 241 |
| Le Khac Quyet | 2004-2006 |  | >300 |
| Na Hang, Tuyen Quang, Vietnam | Ramesh Boonratana | 1993-1994 | 6 | 122 |
| *Rhinopithecus strykeri* | Pianma, Gaoligongshan, Yunnan, China | Chen Yixin | 2013-2014 | 12 | Contact was established on 8 days |
| Luoma, Gaoligongshan, Yunnan, China | Yang Yin | 2015-2017 | 16 | 80 |
| *Pygathrix nemaeus* | Son Tra, Da Nang, Vietnam | Lois Lippold, Vu Ngoc Thang | 1974, 2006-2007, intermittently after 2007 | ~2, ~1, and intermittent monitoring |  |
| Katie Bailey | 2016-2018 | 5 | 84 |
| Jonathan Clayton, Van Tuan Bui | 2012-2013 | 9 |  |
| Dinh Thi Phuong Anh | 2007-2008 | 12 |  |
| Larry Ulibarri, Bui Hui Hoang | 2010-2011 | 16 | 259 |
| Hin Namno, Khammouane, Lao PDR | Phaivanh Phiapalath | 2007-2008 | 16 | 803 |
| Nakai-Nam Thuen, Lao PDR | Camille Coudrat | 2011-2012 | ~4 |  |
| *Pygathrix nigripes* | Nui Chua and Phuoc Binh, Vietnam | Hoang Minh Duc | 2002, 2005 | 13 | 192 |
| Cat Tien, Vietnam | Jonathan O’Brien | 2008-2011 | 25 |  |
| Seima BCA, Mondulkiri, Cambodia | Benjamin Rawson | 2003-2004 | 20 | >43 |
| *Pygathrix cinerea* | Kon Ka Kinh, Gia Lai, Vietnam | Ha Thang Long | 2004-2006, 2007-2008, and ongoing | 8, 12, and ongoing | 480 |
| Nguyen Thi Tinh | 2009-2010 | 17 | 212 |
| *Simias concolor* | Sirimuri, Siberut, Indonesia | Ronald Tilson | 1972-1974 | 21 | 80 |
| Sarabua, Siberut, Indonesia | Kunio Watanabe | 1974-1976 | 10 | 36 |
| Grukna, Siberut, Indonesia | Kunio Watanabe | 1976-1978 | 16 | 312 |
| Sipora Island, Indonesia | Syunzo Kawamura and Erri Megantara | 1985 | 2 |  |
| Sinakak & Simalegu, South Pagai, Indonesia | Richard Tenaza | 1986-1987 | 6 |  |
| Betumonga, North Pagai, Indonesia | Agustin Fuentes | 1992 | 6 |  |
| Lisa Paciulli | 1996 | 4 |  |
| Pungut, Siberut, Indonesia | Susilo Hadi | 2008-2009 | 18 | ~2000 |
| Wendy Erb | 2006-2008 | 24 | >4000 |
| *N. larvatus* | Tanjung Puting, Indonesia | Carey Yeager | 1985 | 12 | 1700 |
| Samunsam, Malaysia | Elizabeth Bennett | 1984-1985 | 16 |  |
| Lower Kinabatangan (Sukau and Abai areas), Malaysia | Ramesh Boonratana | 1991 | 10 | (93 days) |
| Ikki Matsuda | 2005-ongoing |  | >3500 |
| Lower Kinabatangan (Sukau area), Malaysia | Tadahiro Murai | 1999-2002 | 36 | >1513 |
| Padas Damit, Malaysia | Henry Bernard | 2008-2009 | 23 | 192 |
| Gunung Palung, Indonesia | Katie Feilen | 2011-2012 | 12 |  |
| Lower Kinabatangan (Batu Puthi area), Malaysia | Danica Stark / Benoit Goossens | 2011-ongoing |  | (> 400 days) |

1 Following convention, the family name of people of Chinese and Vietnamese origin appears *before* the given name.

Table 12.2. Habitat and climate at odd-nosed monkey study sites

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Species** | **Site** | **Habitat used** | **Latitude** | **Longitude** | **Annual rainfal [mm]** | **Mean annual temp. [˚C]** | **Altitude used [m]** | **References** |
| *Rhinopithecus bieti* | Xiaochangdu | Fir forest | 29°15’ | 98°37’ | 740 | 4.7 | 3500-4250 | Xiang et al. 2007 |
| Wuyapiya | Fir forest | 28°30’ | 99°12’ | 936 | 0.9 | 3300-4600 | Kirkpatrick et al. 1998 |
| Samage | Mixed deciduous broadleaf and conifer forest, some pine, fir and evergreen broadleaf forest | 27°34’ | 99°17’ | 1004 | 10 1 | 2600-4000 | Grueter et al. 2009b |
| Shiba | Coniferous forest, evergreen broadleaf forest and deciduous broadleaf forest mixed with fir trees | 27 42 | 99 13 |  |  | 3000-4000 | Wan et al. 2013 |
| Xiangguqing/  Tacheng | Mixed deciduous broadleaf and conifer forest, some pine, fir and evergreen broadleaf forest | 27°36’ | 99°18’ | 1371 | 7.5 | 2500-3800 | Ding and Zhao 2004 |
| 9.8 | Li D et al. 2010a; Ren et al. 2012b |
| Jinsichang | Mixed deciduous broadleaf and conifer forest | 26°53’ | 99°37’ | 1624 | 5.8 | 3200-3630 | Ren et al. 2009a; Yang 2000 |
| Fuhe | Mixed deciduous broadleaf and conifer forest, fir and deciduous broadleaf forest | 26°25’ | 99°20’ |  |  | 2800-3400 | Liu et al. 2004 |
| Lasha | Mixed deciduous broadleaf and conifer forest | 26°20’ | 99°15’ | 971 | 11.7 |  | Huang et al. 2012 |
| 768 | 12.4 | 2800-3600 2 | Li J et al. 2014 |
| Longma | Mixed deciduous broadleaf and conifer forest | 26°15’ | 99°15’ | 1501 | 8.8 | 2700-3600 | Huo 2005 |
| *Rhinopithecus roxellana* | Baihe | Mixed deciduous broadleaf and conifer forest | 33°15’ | 104°10’ | 566 | 12.6 3 | 2300-4100 | Kirkpatrick and Gu 1999; Kirkpatrick et al. 1999 |
|  | 9.2 | 1750-3000 | Chu et al. 2018 |
| Zhouzhi | Mixed deciduous broadleaf and conifer forest, deciduous broadleaf forest | 33°45’ | 108°15’ | 894 | 10.7 | 1500-2600 | Tan et al. 2007; Qi et al. 2008 |
| 980 | 6.4 | 1500-2750 | Li et al. 2000 |
| Shennongjia | Deciduous broadleaf and coniferous forest | 31°30’ | 110°15’ | 1800 | 5 | 1700-2900 | Li Yiming 2006; Su et al. 1998 |
| Qingmuchuan | Deciduous broadleaf, mixed evergreen and deciduous broadleaf, mixed deciduous and conifer forest | 32°55’ | 105°35’ | 972 | 12.9 | 1000-2000 | Li Yankuo et al. 2010 |
| Laohegou | Mixed broadleaf forest | 32°25 | 104°32’ | 760-1231 | 14.7 | 1100-3100 | Fang et al. 2018b |
| *Rhinopithecus brelichi* | Fanjingshan | Subtropical-temperate mixed deciduous and evergreen broadleaf forest | 27°55’ | 108°45’ | 1433 | 9.2 | 800-2200 | Bleisch et al. 1993; Niu et al. 2010; Xiang et al. 2010b |
| *Rhinopithecus avunculus* | Khau Ca | Tropical-subtropical hilly evergreen broadleaf forest on karst limestone formations | 22°50’ | 105°10’ | 2300 | 23.3 | 600-1300 | Le et al. 2007, Le KQ pers. comm. |
| 2447 | 23.7 |  | Le 2014 |
| 1983 | Ca 26 |  | Dong 2007, 2011 |
| Na Hang | Tropical-subtropical hilly evergreen broadleaf forest on karst limestone formations | 22°18’ | 105°27’ | 1540 | Ca 22 |  | Boonratana and Le 1998 |
| *Rhinopithecus strykeri* | Pianma (Gaoligongshan) | Humid evergreen broadleaf forest, Yunnan hemlock forest and mixed bamboo-conifer forest | 26°02’ | 98°39’ | 1000-3900 | 14-17 | 2400-3300 | Chen et al. 2015 |
| Luoma (Gaoligongshan) | Mixed conifer-broadleaf forest  moist evergreen broadleaf forest, Yunnan hemlock forest and mixed bamboo-conifer forest | 26°03’ | 98°44’ | 3300 | 11-13 | 2500-3300 | Yang Yin, unpubl. |
| Maw River area, Kachin, Myanmar | Cool temperate rain forest, mixed temperate forest and silver fir forest | 26°43’ | 98º39’ |  |  | 1720-3190 2 | Geissmann et al. 2011 |
| *Pygathrix nemaeus* | Son Tra | Tropical secondary evergreen forest, secondary dry forest, grasslands, cultivated lands | 16°07’ | 108°18’ | 2540 |  | 0-696 | Lippold 1977; van Peenen et al 1971 |
| 2393 | 25.7 | Ulibarri 2013 |
| Hin Namno | Tropical evergreen forest and mixed deciduous forests on karst limestone | 17°25’ | 105°55’ | 1503 | 25.0 | 200-1000 | Phiapalath 2009; Timmins and Khounboline 1996 |
| Nakai-Nam Thuen | Mixed dry semi-evergreen and evergreen forest, wet evergreen forests, upper montane forests | 17°50’ | 105°30’ | 1865-2620 | Ca 19 | 500-2300 | Coudrat et al. 2014; Timmins and Evans 1996 |
| *Pygathrix nigripes* | Nui Chua | Scrubland, dry deciduous forest, tropical savannah woodland, evergreen forest, sub-montane evergreen forest | 11°44’ | 109°10’ | 697 | 27 | 0-1040 | Hoang 2007 |
| Phuoc Binh | Mixed broadleaf/conifer forests, sub-montane evergreen forests, coniferous forests, dry broadleaf semi-deciduous forests, mixed bamboo and broadleaf forests, grassland | 11°58’ | 108°45’ | >2000 | ~26.5 | 700-1978 | Hoang 2007 |
| Cat Tien | Lowland evergreen and semi-evergreen forest, freshwater wetlands, flooded forest, bamboo and grassland | 11°34’ | 107°22’ | 2518 | 26.4 | ~100-659 | Birdlife 2004; Deshcherevskaya et al. 2013 |
| Seima BCA | Evergreen and semi-evergreen forest, mixed deciduous, wetlands | 12°20’ | 106°50’ | 2430-2770 | 24.6 | 100-700+ | Rawson 2009 |
| *Pygathrix cinerea* | Kon Ka Kinh | Sub-tropical evergreen and mixed deciduous lower montane forests, lowland evergreen forest | 14°20’ | 108°22’ | 1700 | ~22 | 570-1748 | Ha 2009 |
| *Simias concolor* | Sirimuri | Hilly primary dense evergreen rainforest | 1°24’ | 99°1’ | >4000 |  | 70 – 90 | Tilson 1977 |
| Sarabua | Dense evergreen dipterocarp forest | 1°27’ | 99°7’ |  |  |  | Watanabe 1981 |
| Grukna | Mosaic of primary dipterocarp forest and secondary growth | 1°00’ | 98°55’ |  |  |  | Watanabe 1981 |
| Pagai | Swamp, Primary dipterocarp/mixed forest, secondary forest, gardens | 2°49’ | 100°2’ | 4,420 |  |  | Tenaza and Fuentes 1995 |
| Pungut | Primary mixed evergreen rainforest | 1°01’ | 95°50’ | 3,601 | 26.6 | 25-190 | Erb et al. 2012a,b; Hadi et al. 2012 |
| *N. larvatus* | Lower Kinabatangan (Sukau) | Secondary riverine forest | 5°30’ | 118°30’ | 2563 | 27 | 10-20 | Ancrenaz et al. 2004; Boonratana 2000; Matsuda et al. 2019c |
| Lower Kinabatangan (Abai) | Mangrove forest | 5°41’ | 118°32’ |
| Gunung Palung | Mixed forest (mangrove, riverine and peat swamp) | 1°27’ | 110°4’ | 3295 | 29 |  | Feilen and  Marshall 2014 |
| Samunsam | Mixed (mangrove and primary lowland forest) | 1°78’ | 109°36’ | 3000 | 27 | 25 | Bennett and  Sebastian 1988 |
| Tanjung Puting | Fresh water peatswamp forest | 2°46’ | 111°52’ | 3026 | 26 | 5-10 | Yeager 1989; Wich et al. 2011 |
| Padas Damit |  | 5°21’ | 115°30’ | 3,540 | 22-35 (ramge) | 0-10 | Bernard et al. 2019 |

1 Climate data collected 800 m below study site; values corrected for altitude; 2 Estimate; 3 Climate data recorded 1000 m below study site; values corrected for altitude.

Table 12.3. Dietary composition and richness in odd-nosed monkeys.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Species** | **Site** | **Dietary composition (% time spent feeding)** | | | | | | |  | **References** |
| **Fruit, seeds** | **Leaves unsp.** | **Young leaves, buds** | **Mature leaves** | **Lichen** | **Other** | **Flowers** | **Number plant species in diet** 1 |
| *Rhinopithecus bieti* | Samage | 11 |  | 16 | 4 | 67 | 2 | 0 | 109 | Grueter et al. 2009a, 2009b |
| Xiaochangdu | 1 |  | 12 |  | 82 | 5 |  | 28 | Xiang et al. 2007 |
| Wuyapiya | 0 | 6 |  |  | 86 | 8 |  | ~25 | Kirkpatrick 1996 |
| Xiangguqin/Tacheng | 11 |  | 11 | 16 | 51 | 9 | 2 | 105 | Li et al. 2011 |
|  | 31 |  |  | 60 |  |  | 59 | Ding and Zhao 2004 |
| Fuhe |  |  |  |  | 63 |  |  |  | Liu et al. 2004 |
| Lasha | 7 |  | 4 | 5 | 80 | 3 | 1 |  | Huang et al. 2017b |
| Longma | 5 | 80 |  |  | 13 |  | 2 | 97 | Huo 2005 |
| *Rhinopithecus roxellana* | Zhouzhi East | 29 | 24 | 4 |  | 29 | 13 |  | 86 | Guo et al. 2007 |
| Zhouzhi West (Yuhuangmiao) | 23 |  | 36 | 17 | 1 | 21 | 2 |  | Hou et al 2018 |
| Guanyinshan/Foping | 25 | 7 | 20 | 11 | 22 | 15 |  | 53 | Zhao et al. |
| Qianjiaping/Shennongjia | 15 |  | 33 | 4 | 43 | 4 | 1 | 23 | Li Yiming 2006 |
| 30 |  | 19 | 9 | 38 | 1 | 1 | 15 | Liu et al. 2013b |
| Baihe |  |  |  |  | 71 2 |  |  | >38 | Kirkpatrick and Grueter 2010 |
| Qingmuchuan |  |  |  |  | 0 |  |  | 42 | Li Yankuo et al. 2013 |
| *Rhinopithecus brelichi* | Fanjingshan | ~9 | ~45 | ~34 |  |  |  | ~8 | ~37 | Bleisch et al. 1993; Bleisch and Xie 1998 |
| 24 | 34 | 29 |  |  |  | 7 |  | Nie et al. 2009 |
| 22 |  | 41 | 22 |  | 6 | 9 | 107 | Xiang et al. 2012 |
|  |  |  |  |  |  |  | 104 | Guo Y et al. 2018 |
| *Rhinopithecus avunculus* | Na Hang | 62 |  | 38 |  |  |  |  |  | Boonratana and Le 1998 |
| Khau Ca | 53 |  | 11 | 22 |  | 3 | 8 | 31 | Le et al. 2007 |
| 32 |  | 46 | 7 |  | 2 | 12 | 50 | Dong 2011 |
| *Pygathrix nemaeus* 3 | Son Tra | 10 |  | 60 | 28 |  | 0.5 | 1.5 | >62 | Ulibarri 2013 |
| Hin Namno | 34 | 55 |  |  |  | 7 | 4 | 112 | Phiapalath et al. 2011 |
| Ha Tinh, Son Tra, and Mad Rak | 37 | 63 |  |  |  |  |  | 50 | Pham 1993a, 1994 |
| *Pygathrix nigripes* | Nui Chua | 32 | 55 |  |  |  |  | 12 | 135 | Hoang et al. 2009 |
| Phuoc Binh | 27 | 55 |  |  |  |  | 16 | 39 | Hoang et al. 2009 |
| Seima | 51 | 10 | 24 | 6 |  |  | 9 | 35 | Rawson 2009 |
| Cat Tien |  |  |  |  |  |  |  | <40 | O’Brien et al. 2012 |
| *Pygathrix cinerea* | Kon Ka Kinh | 41 |  | 50 | 9 |  |  |  | 166 | Ha 2009 |
|  |  |  |  |  |  |  | 135 | Nguyen et al. 2012 |
| *Simias concolor* | Pungut | 18 | 5 | 42 | 6 |  | 1 | 27 |  | Erb et al. 2012a |
| 23 | 57 |  |  |  |  | 18 | 99 | Hadi et al. 2012 |
| Betumonga | 45 |  | 30 | 5 |  |  | 15 |  | Paciulli 2011 |
| *N. larvatus* | Tanjung Puting | 40 | 8 | 41 | 3 |  | 5 | 3 | 55 | Yeager 1989 |
| Samunsam | 50 |  | 38 | 3 |  | 6 | 3 |  | Bennett and Sebastian 1988 |
| Lower Kinabatangan (Sukau) | 25 |  | 66 | < 1 |  | 4.7 | 4 | >36 | Boonratana 2003 4 |
| 26 |  | 66 | <1 |  | 2 | 8 | 188 | Matsuda et al. 2009a |
| Lower Kinabatangan (Abai) | 30 |  | 61 |  |  | 1 | 8 | >18 | Boonratana 2003 4 |
| Gunung Palung | 31 |  | 38 | 6 |  | 9 | 12 | 69 5 | Feilen and Marshall 2020 |

1 Including lichens and fungi. 2 For May–Jun and Sep–Dec only, averaging both 1997 and 1998. 3 Additional dietary data were reported by Lippold (1998) combining observations on *P. nemaeus* and *P. nigripes*. 4 Data for two different groups were averaged. 5 Number of genera, not species.

Table 12.4. Activity budgets in odd-nosed monkeys.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Species** | **Site** | **Activities (% time spent engaged in)** | | | | **References** |
| **Feeding** | **Moving** | **Resting** | **Other** |
| *Rhinopithecus bieti* | Xiaochangdu | 49 | 20 | 18 | 13 | Xiang et al. 2010a |
| Wuyapiya | 32 | 36 | 22 | 10 | Kirkpatrick 1996 |
| Samage | 38 | 19 | 29 | 14 | Grueter et al. 2013 |
| Xiangguqing (Tacheng) | 35 | 15 | 33 | 17 | Ding and Zhao 2004 |
| Xiangguqing (Tacheng) | 39 | 27 | 21 | 13 | Li D et al. 2013b |
| Fuhe | 30 | 15 | 41 | 14 | Liu et al. 2004 |
| Lasha | 42 | 23 | 27 | 8 | Huang et al. 2017b |
| *Rhinopithecus roxellana* | Zhouzhi East | 36 | 23 | 36 | 5 | Guo et al. 2007 |
| Zhouzhi West | 35 | 19 | 27 | 19 | Lu and Li 2006 |
| Qianjiaping/ Shennongjia | 24 | 36 | 9 | 31 | Li Yiming 2009 |
| 27 | 37 | 30 | 6 | Liu 2012; Liu et al. 2013a 1 |
| *Rhinopithecus brelichi* | Fanjingshan | 31 | 24 | 24 | 21 | Yang Yeqin et al. 2002 |
| *Rhinopithecus avunculus* | Khau Ca | 15 | 19 | 33 | 33 | Dong 2007 |
| Na Hang |  | 40 |  |  | Boonratana and Le 1998 |
| *Pygathrix nemaeus* | Son Tra | 14 | 29 | 35 | 22 | Ulibarri 2013 |
| Hin Namno | 40 | 10 | 33 | 19 | Phiapalath 2009 |
| 30 | 23 2 | 26 | 21 | Phiapalath and Suwanwaree 2010 |
| *Pygathrix nigripes* | Nui Chua and Phuoc Binh | 35 | 15 | 43 | 7 | Hoang 2007 |
| Seima BCA | 27 | 7 | 61 | 5 | Rawson 2009 |
| *Pygathrix cinerea* | Kon Ka Kinh | 12 | 26 | 37 | 25 | Ha 2009; Ha et al. 2010 |
| *Simias concolor* | Pungut | 33 | 19 | 42 | 5 | Erb 2008 |
| 33 | 6 | 55 | 2 | Hadi et al. 2012 |
| Betumonga | 44 | 7 | 46 | 3 | Paciulli and Holmes 2008 |
| *Nasalis larvatus* | Bako, Malaysia | 51 | 23 | 26 | 1 | Salter et al. 1985 |
| Samunsam | 11 | 27 | 58 | 4 |
| Lower Kinabatangan (Sukau) | 19.5 | 3.5 | 76.5 | 0.5 | Matsuda et al. 2009a |

1 Means of global activity budget for 2 groups. 2 Moving is made up of 10% travelling and 13% foraging.

Table 12.5. Ranging and population density for odd-nosed monkeys.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Species** | **Site** | **Home range size [ha]** | **Population density [inds./km2]** | **Day journey length [m] (mean and range)** | **References** |
| *Rhinopithecus bieti* | Xiaochangdu | 2125 | 9.1 | 765 (350-3500) | Xiang et al. 2013b |
| Wuyapiya | 2525 | 6.9 | 1310 (300-2950) | Kirkpatrick et al. 1998 |
| Samage | 2475 1 | 16.6 | 1514 (212-4216) | Grueter et al. 2008, 2013 |
| Xiangguqing/ Tacheng | 1714 2 | 20.4 |  | Li D et al. 2010b |
| Jinsichang | 1780 3 | 10.1 | 909 (180-3626) | Ren et al. 2009a, 2009b |
| Fuhe | 1070 | 7.5 | 801 | Liu et al. 2004 |
| Longma | 956 | 8.4 |  | Huo 2005 |
| *Rhinopithecus roxellana* | Baihe | 3600 | 11.1 | 1560 | Kirkpatrick and Gu 1999 |
|  | 5142 | 3.8 |  | Chu et al. 2018 |
| Zhouzhi East | 1830 | 7.2 | 2100 (750-5000) | Tan et al. 2007 |
| 609 3 |  |  | Qi et al. 2014 |
| Zhouzhi West | 2250 | 4 4 |  | Li et al. 2000 |
| 929 3 |  |  | Qi et al. 2014 |
| Dalongtan/Shennongjia | 4000 | 8.5 |  | Su et al. 1998 |
| Qianjiaping/Shennongjia |  |  | ~1500 (500-3760) | Li Yiming 2002; Fan et al. 2018 |
| 2250 5 | 14.8 | 1109 (202-4136) | Liu 2012 |
| Qingmuchuan | 2035 | 5.4 | 840 (140-1840) | Li Yankuo et al. 2010 |
| *Rhinopithecus brelichi* | Fanjingshan | 3500 | 11.4 | 935 (523-1672) | Kirkpatrick 1998; Niu et al. 2010 |
| *Rhinopithecus avunculus* | Na Hang | >1000 | <8 |  | Boonratana and Le 1998 |
| Khau Ca | 625 | 14.4 | 1385 (800-2030) | Dong 2010 |
| 1600 | 5.6 |  | Le et al. 2006 |
|  |  | 763 6 | Thach and Covert 2010 |
| *Rhinopithecus strykeri* | Pianma | ~1200 | 8 |  | Li G et al. 2014 |
| 2290 |  |  | Chen et al. 2015 |
| *Pygathrix nemaeus* | Son Tra |  | 4.5 7 |  | Vu et al. 2007 |
| 36 |  | 509 (137-987) | Ulibarri 2013 |
| Phong Nha-Ke Bang |  | 1.5 |  | Haus et al. 2009a |
| Hin Namno | 292 | 86.8 8 |  | Phiapalath 2009 |
| Nakai-Nam Thuen |  | 36.4 9 |  | Courdrat et al. 2013 |
| *Pygathrix nigripes* | Nui Chua | 31.2 | 6.3 | 1000 | Hoang 2007 |
| Phuoc Binh | 49 |  | 903 | Hoang 2007 |
| Seima BCA | 20.1 | 54 | 943 10 | Pollard et al. 2007; Rawson 2009 |
| *Pygathrix cinerea* | Kon Ka Kinh | 984 |  | 1068 (50-4080) | Ha 2009; Ha et al. 2010 |
| *Simias concolor* | Pungut | 7.2 11; 7.7 12 |  |  | Erb 2012 |
| 7.8 11; 5.8 12 |  |  | Hadi et al. 2012 |
| Simalegu | 15-19 | 18 |  | Tenaza and Fuentes 1995 |
| Sinakak | 20 | 20 |  | Tenaza and Fuentes 1995 |
| Betumonga | 7-20 | 26 |  | Tenaza and Fuentes 1995 |
| Sirimuri | 25-30 | 10 |  | Tilson 1977 |
| Sarabua | 6.5-20 | 7 |  | Watanabe 1981 |
| Grukna | 2.5-5 | 220 |  | Watanabe 1981 |
| Betumonga |  |  | 250-700 | Paciulli 2011 |
| *Nasalis larvatus* | Lower Kinabatangan (Sukau) | 22113 | 14.6 15 | 910 (370-1810) | Boonratana 2000 |
| 13814 | 3.5-29.8 15 | 799 (220-1734) | Matsuda et al. 2009b |

1 Not corrected for slope. 2 In 2007. 3 Based on GPS telemetry. 4 In 1997. 5 Based on 11 months of data from the larger group at the site (using Kernel Density Estimation). 6 n=2. 7 Based on reported population/protected area size. 8 Based on 5.8 groups/km2 reported. 9 Based on 2.8 groups/km2 and 13 individuals/group reported. 10 Estimated from partial day follows. 11 95% Kernel. 12 Minimum Convex Polygon. 13 Grid-cell method (100x100m). 14 Grid-cell method (50x50m). 15 Individuals per km of river survey length.

Table 12.6. Social organization of odd-nosed monkeys.

| **Species** | **Site** | **Group/band size** | **Mean unit size** | **Mean number of adult males per unit** | **Total number of adult males in band** | **Mean number of adult females per unit** | **Total number of adult females in band** | **AMU [no. individuals]** | **References** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *Rhinopithecus bieti* | Xiaochangdu | 207 | 9-14 |  | 32 |  | 71 | Yes [14] | Xiang 2005; Xiang et al. 2013b; Xiang, pers. comm. |
| Wuyapiya | >175 |  |  |  |  |  | Yes 1 | Kirkpatrick et al. 1998 |
| Nanren 2 | 225 3 | 7.1 (n=26 OMUs) | 1 | 26 | 3.8 | 98 | Yes [16.5] (n=2 AMUs) | Cui et al. 2008 |
| Shiba | 200 | UNK (n=15 OMUs) | 1 |  | 2-3 |  |  | Wan et al. 2013 |
| Samage | ~410 |  |  | 63 4 |  | 138 | Yes [up to 17] | Grueter et al. 2017a |
| Xiangguqing/Tacheng | 366 5 | 11.3 (n=19 OMUs) 6 | 1 6 |  | 4.7 6 |  | Yes [14.5] (n=2 AMUs) | Liu Z et al. 2007b |
| 450 7 |  |  | 81 8 |  | 207 8 | Yes [21.5] (n=2 AMUs) | Li D et al. 2010b; Ren et al. 2012b |
| ~480 9 | UNK (n=47-55 OMUs) |  |  |  |  | Yes [40-50] (n=1 AMU) | Li D et al. 2013b |
| 89 10 | 7.4 | 1 | 8 | 3.1 | 27 | Yes | Ren et al. 2011 |
| Jinsichang | 180 |  |  |  |  |  | Yes | Ren et al. 2009b |
|  | 10.2 |  |  |  |  |  | Yang 2000 |
| Fuhe | ~80 |  |  |  |  |  |  | Liu et al. 2004 |
| Lasha | 100 |  |  |  |  | 27 | Yes | Huang et al. 2012 |
| Lasha | 130 | UNK (n=11 OMUs) |  |  |  |  | Yes (n=2 AMUs) | Li J et al. 2014 |
| Longma | 80 |  |  |  |  |  |  | Huo 2005 |
| *Rhinopithecus roxellana* | Baihe | >400 |  | 1-2 | 27 11 | Up to 9 | 67 | Yes [18] | Kirkpatrick and Gu 1999 |
| 197 |  |  | 25 |  | 52 |  | Chu et al. 2018 |
| Zhouzhi East | 112 |  |  | 11 |  | 41 | Yes [4-7] | Tan et al. 2007 |
| Zhouzhi West 12 | 87 13, 14 | UNK (n=7 OMUs) |  |  |  |  | Yes [16] | Qi et al. 2014 |
| 113 15 | 9.0 (n=6-8 OMUs) 15 | 1 | 8 16 | 3.3 | 26 16 |  | Zhang et al. 2006 |
| 58 13, 14 | UNK (n=7 OMUs) |  |  |  |  | Yes (12) 17 (n=1 AMU) | Huang et al. 2017a |
|  | 11.4 (n=6-8 OMUs) 18, 19 |  |  | 4.2 18,19 |  |  | Wei et al. 2012 |
|  |  |  |  |  |  | Yes [16-24] 18, 20 | Yan 2012 |
| 138 14, 18 | n=13 OMUs |  |  |  |  | Yes [28] (n=3 AMUs) | Qi et al. 2014 |
| 200 14, 18, 21 | n=15 OMUs |  | 18 11 | 4.2 | 56 | Yes [32] (n=1 AMU) 22 | Huang et al. 2017a |
| Dalongtan/Shennongjia | 340 | 18 23 | 1.1 |  | 7 |  | Yes [mostly 3-7, up to 25] | Ren et al. 1998; Ren et al. 2000 |
| 43 12 | 10.1 (n=4 OMUs) | 1 |  |  | ~15 | Yes [5.7] | Yao et al. 2011 |
| 80 12 | UNK (n=5 OMUs) |  |  |  |  | Yes [5] (n=1 AMU) | Yao et al. 2016 |
| Jinghouling/Shennongjia | 205 |  |  |  |  |  |  | Li Yiming 2004; Li Yiming, pers. comm. |
| Qianjiaping/Shennongjia (Group Q1) | 130 |  |  |  |  |  |  | Li Yiming 2006 |
| 236 |  |  | 106 |  | 77 |  | Liu 2012; Liu et al. 2013a |
| Qianjiaping/Shennongjia (Group Q2) | 62 |  |  | 23 24 |  | 22 24 |  | Liu 2012; Liu et al. 2013a |
| Qingmuchuan | ~110 |  |  |  |  |  |  | Li Yankuo et al. 2010 |
| Laohegou, Sichuan | 130 | 8.3 (n=12 OMUs) | 1 |  | 2.7 |  | Yes [31] | Huang et al. 2014; Fang et al. 2018b |
| *Rhinopithecus brelichi* | Fanjingshan | >450 | 6.1 (n=15 OMUs) | 1 |  | 2.2 |  | Yes [5-7] | Bleisch et al. 1993 |
| 7.6 (n=30 OMUs) | 1 | 30 | 2.5 | 75 | Yes [2-5] | Nie et al. 2009 |
| 55-356 25 | 5.25 (n=8 OMUs) | 1 |  | 2 |  |  | Guo et al. 2017 |
| *Rhinopithecus avunculus* | Khau Ca | 90 27 | 11.3 (n=4 OMUs) | 1 | 7 | 3.8 | 25 | Yes [7] 28 | Dong 2010, 2011 |
| Na Hang (Tat Ke) | 80 | 15.2 (n=5 OMUs) | 1 |  | 4.8 |  | Yes [10] (n=2 AMUs) | Boonratana and Le 1998 |
| 22 | 7 (n=2 OMUs) | 1 |  | 3.5 |  | Yes [5] (n=1 AMU) | Dong 2011 |
| *Rhinopithecus strykeri* | Pianma | ~100 | UNK (n=22 OMUs) |  |  |  |  | Yes (n=1) | Li G et al. 2014 |
| 90 26 |  | 1 (n=5 OMUs) | 31 | 4.6 | 29 | Yes (n=1) | Chen et al. 2015 |
| *Pygathrix nemaeus* | Son Tra |  | 6 (n=2 OMUs) | 1.5 |  | 3 |  |  | Gochfeld 1974 |
| 60 29 | 9.3 (n=3 OMUs) | 1.3 |  | 3.7 |  |  | Lippold 1977 |
|  | 11.5 (n=2 OMUs) 30 |  |  |  |  |  | Lippold 1998 |
| 14.3 (n=12 groups) 30 |  |  | 4.2 |  | 7.8 |  | Lippold and Vu 2008 |
| 15.2 (n=13 groups) 30 |  |  | 3.5 |  | 7.3 |  | Dinh et al. 2010 |
| 18 | 6.5 (n=3 OMUs) | 1.4 | 3.7 | 2.1 | 5.7 | Yes [3-6] (n=2 AMUs) | Ulibarri 2013 |
| Phu Mat | 30.3 30 |  |  | 6 |  | 15.3 |  | Lippold 1998 |
| Bach Ma | 18 30 |  |  | 4.5 |  | 11.5 |  | Lippold 1998 |
| Phong Nha-Ke Bang |  | 6.3 (n=13 OMUs) |  |  |  |  |  | Haus et al. 2009a |
| Hin Namno | 31 30 |  |  | 2.5 (n=2 bands) |  | 4.6 |  | Phiapalath et al. 2011 |
| *Pygathrix nigripes* | Nui Chua | 22.8 | 8.8 (n=18 OMUs) | 1.6 |  | 3.3 |  | Yes [2-3] (n=4 AMUs) | Hoang 2007 |
| Phuoc Binh | 12.8 | 7.7 (n=10 OMUs) | 1.4 |  | 3.1 |  | Yes [2] (n=1 AMU) | Hoang 2007 |
| Seima BCA | 20 31 | 7.5 (n= 200 units) 30 |  |  |  |  | Yes [17] (n=1 AMU) | Rawson 2009 |
| *Pygathrix cinerea* | Kon Ka Kinh | 26.3 | 11.8 32 |  |  |  |  | Yes [2-5] | Ha 2009 |
| *Simias concolor* | Pungut |  | 7.9 (n=8) | 1 |  | 3 |  | Yes [4.5] (n=2 AMUs) | Erb et al. 2012b |
| Sirimuri |  | 3.8 (n=4) | 1 |  | 1 |  |  | Tilson 1977 |
| Sarabua |  | 3.1 (n=7) | 1 |  | 1 |  |  | Watanabe 1981 |
| Grukna |  | 6.4 (n=23) | 1 |  | 1.9 |  |  | Watanabe 1981 |
| Betumonga |  | 5.5 (n=6) 33 | 1.2 |  | 2.5 |  | Yes [2] (n=1 AMU) | Tenaza and Fuentes 1995 |
| Loh Bajou |  | 8.7 (n=3) | 1 |  | 3.3 |  | Yes | Hadi et al. 2009 |
| Simalegu |  | 3.1 (n=7) | 1 |  | 1.3 |  |  | Tenaza and Fuentes 1995 |
| Sinakak |  | 5.0 (n=4) | 1 |  | 2.8 |  |  | Tenza and Fuentes 1995 |
| *Nasalis larvatus* | Lower Kinabatangan (Sukau) | 72 (n=2 bands) | 18 (n=8) | 1 | 4 (n=2 bands) | 7 34 | 28 (n=2 bands) | Yes [30] (n=1 AMU) | Murai 2004b |
| Tanjung Puting | 60 (n=2 bands) | 12.6 | 1 | 5.5 (n=2 bands) | 5 | 22 (n=  2 bands) | Yes [9.5] (n=2 AMUs) | Yeager 1991b |

1 AMU: Core of two males and several juveniles. 2 The Nanren band is thought to be synonymous with the Wuyapiya band. 3 Demographic data for 2005. 4 46 excluding putative AMU males. 5 Demographic data for 2001. 6 OMUs only since MMUs could not be umanbiguously identified. 7 Demographic data for 2007. 8 Ren et al., unpubl. 9 Demographic data for 2008/2009, i.e. before the group was split through human intervention. 10 Data from human-managed tourist group in 2010. 11 Excluding AMU males. 12 This is a provisioned and human-managed group. 13 Demographic data for ‘DJF band’ that split off from a larger ‘troop in 2002. 14 AMU males not included in band size. 15 This is the largest number observed; it was 63 in 2001. 16 Group composition data for 2001. 17 AMU with 10 subadult and adult males and 2 juvenile males. 18 Demographic data for ‘GNG band’ that split off from a larger ‘troop’ in 2002. 19 Data for 2009 and 2010. 20 Data for 2007 and 2008. 21 Demographic data for 2015; data from Table 1 in Huang et al. (2017a) [information given in text conflcits with information in table]. 22 AMU with 21 adult [and subadult?] males and 11 juveniles. 23 Ren et al. (1998) state that mean OMU size is 12. 24 Adult males were usually more visible than other age-sex classes, thus leading to a likely bias in group composition estimations. 25 Size varies depending on whether groups are fused or not. 26 Demographic data based on camera trap images may not give a completely accurate picture of the demographics/sex ratio, as traps were set up on the ground and some individuals may have been missed (eg. females with dependent infants which that tend to be more arboreal). 27 Estimate; largest counted number of monkeys in band was 81. 28 All-juvenile unit. 29 Reported from interview. 30 Based on reported group sizes, as no distinction is made between band and unit levels of organization. 31 Largest reported group size. 32 Based on 179 group observations, reported on frequency not number (OMUs=43%, MMU=29%, and AMU=4.5% of total observations); 33 n=5 OMUs and 1 MMU. 34 This includes subadult females (adults only: 4.9).