**Supplementary material**

**Table S1**: Details of the literature reviewed to understand the ecological differences in diet diversity, howling parameters and cranial morphometry of Woolly and Indian wolf

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S.no.** | **Author/s** | **Study Area** | **Article type** | **Field of research** | **Journal/Publisher/Institute** |
| **Food Habit** |
| **1** | Anwar et al., 2012 | Baltistan, Pakistan | Research Article | The study assessed the food habits of wolves | Pakistan Journal of Zoology |
| **2** | Bocci et al., 2017 | Karakoram, Pakistan | Research Article | The study investigated the food habits and diet overlap of Snow leopard and Tibetan wolf | European Journal of Wildlife Research |
| **3** | Chetri et al., 2017 | Annapurna-Manaslu Landscape, Nepal | Research Article | The study assessed factors associated with variation in the diets in snow leopards and wolves | Plos *One* |
| **4** | Habib, 2007 | Solapur, Maharashtra, India | Doctoral Thesis | The study investigated prey density, food habits, space use and denning behaviour of Indian wolf | Aligarh Muslim University |
| **5** | Jethva et al., 1997 | Kutch, Gujarat, India | Technical Report | The study assessed the impact of ignite mining in Kutch on Indian grey wolf | Wildlife Institute of India |
| **6** | Jethva and Jhala, 2004 | Bhal, Gujarat, India | Research Article | The study assessed diet of Indian wolf and economics related to livestock depredation | Biological Conservation |
| **7** | Jhala, 1991 | Velvadar Blackbuck Sanctuary, Gujarat, India | Doctoral Thesis | The study investigated the food habits, energy and protein available and habitat use of wolf and blackbuck | Virginia Polytechnic Institute and State University |
| **8** | Jhala, 2001 | Abdasa, Gujarat, India | Technical Report | The study assessed the food habits of Indian grey wolf in Abdasa Region, Gujarat | Wildlife Institute of India |
| **9** | Maurya et al., 2011 | Rahekhuri, Maharashtra, India | Research Article | The study assessed the food habits of Indian wolves | Journal of Zoology |
| **10** | Shahi, 1982 | Bihar, India | Research Article | The study assessed the status and food habit of Indian wolf | Journal of Bombay Natural History Society |
| **11** | Lyngdoh et. al., 2020 | High elevation rangelands of Asia | Research Article | The study reviewed the food habits of Woolly wolf across its range | Journal of Zoology |
| **12** | Habib et. al., 2021 | Trans-Himalaya, India | Project Report | The study assessed the ecology of Himalayan wolf in India | Wildlife Institute of India |
| **13** | Subba, 2012 | Upper Dolpo Valley, Nepal | Project Report | The study assessed the distribution pattern, potential prey and genetics and investigated human-wolf conflict | Department of Biology, Lund University |
| **14** | Ahmed et al., 2017 | Kargil District, Ladakh, India | Research Article | The study is aimed to provide information on the diet of Tibetan wolf and red fox | Proceeding Zoological Society |
| **15** | Werhahn et al., 2019 | China and Nepal | Research Article | The study assessed the foraging ecology of Tibetan wolves and compared the livestock depredation of wolves and snow leopard | Global Ecology and Conservation |
| **Howling Parameters** |
| **16** | Hennelly et al., 2017 | Maharashtra, Trans-Himalayan Regions, India | Research Article | The study assessed the differences in acoustic parameters of Himalayan, North American and Indian wolf | Current Zoology |
| **17** | Sadhukhan et al., 2019 | Maharashtra, India | Research Article | The study investigated the acoustic structure of harmonic vocalisations of Indian wolvesand classifies these harmonic vocalisations | Plos *One* |
| **Cranial morphometry** |
| **17** | Allen, 1938 | Western China and Eastern Tibet | Proceeding Report | The study investigated morphological characteristics of several mammals of China and Tibet | Proceedings of the Academy of Natural Sciences of Philadelphia |
| **18** | Pocock, 1941 | India, Myanmar and Sri Lanka | Book | The book comprises the general ecology and morphological feature of various fauna of India, Myanmar and Sri Lanka | Taylor and Francis Publisher, London |
| **19** | Srinivas and Jhala, 2021 | India and Pakistan | Research Article | The study compared the cranial and morphological measurement of Jackal, Indian and Himalayan wolf | Biodiversity Data Journal |

**Table S2:** Food item reported in the published studies as %frequency of occurrence in the diet of Woolly wolf (*C. l. chanco*) from Nepal, India and Pakistan

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Food Item | Anwar et al., 2012 | Subba, 2012 | Chetri et al., 2017 | Bocci et al., 2017 | Ahmed et al., 2017 | Werhahn et al., 2019 | Lyngdoh et al., 2020 and Habib et al., 2021b | Food item in number of scats | Frequency of occurrence (%RFO) |
| Argali |  |  | 5 |  |  |  | 11 | 16 | 1.83 |
| Kiang | - |  | 6 |  | - | 7 | 15 | 28 | 3.22 |
| Urial | - |  | - | - | - | - | 7 | 7 | 0.81 |
| Ibex | 1 |  | - | 10 | 1 | - | 17 | 29 | 3.34 |
| Blue Sheep | - | 2 | 3 | - | - | 16 | 45 | 66 | 7.60 |
| Pika | - | 1 | 0.4 | - | - | - | 73 | 74 | 8.56 |
| Marmot | 0.6 | 3 | 18.3 | - | 7 | 33 | 38 | 100 | 11.50 |
| Hare | - | 0.2 | 2.7 | - | - | 1 | 12 | 16 | 1.83 |
| Birds | - | - | 0.2 | - | - | 1 | 10 | 11 | 1.29 |
| Cattle | 0.6 | - | 2.6 | 2 | - | 26 | 119 | 150 | 17.29 |
| Goat | 2.5 | 2.5 | 4.9 | 13 | 9 | 4 | 156 | 192 | 22.09 |
| Horse | - | 4.6 | 3 | - | - | 2 | 12 | 22 | 2.49 |
| Donkey | - | - | - | - | - | - | 19 | 19 | 2.19 |
| Vegetative matter | 1.3 | 0.8 | - | - | - | 47 | 7 | 56 | 6.46 |
| Sheep | 0.6 | 0.7 | 0.7 | 22 | 4 | - | - | 28 | 3.22 |
| Yak | 1.3 | 2.3 | 2.4 | 1 | 2 | - | - | 9 | 1.04 |
| Unidentified | 2.5 | 2 | - | - | 1 | 12 | - | 18 | 2.01 |
| Gazelle | - | - | 6 | - | - | 2 | - | 8 | 0.96 |
| Rodents | - | - | 2 | - | - | 7 | - | 9 | 1.00 |
| Dzo | - | 1 | - | - | - | - | - | 1 | 0.13 |
| Others | - | - | - | 10 | - | 1 | - | 11 | 1.26 |
|  |  |  |  |  |  |  | Total | 869 | 100 |

**Table S3:** Food item reported in published studies as %frequency of occurrence in the diet of Indian wolf (*C. l. Pallipes*) from Bihar, Gujrat and Maharashtra States of India

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Food Items** | **Shahi, 1982** | **Jhala, 1991** | **Jethva et al., 1997** | **Jhala, 2001** | **Jethva & Jhala, 2004** | **Habib, 2007** | **Maurya et al., 2011** | **Food item in number of scats** | **Frequency of occurrence****(%RFO)** |
| **Blackbuck** | - | 433 | - | - | 556 | 1088 | 125 | 2203 | 31.95 |
| **Birds** | - | 2 | - | - | 41 | 83 | - | 126 | 1.83 |
| **Buffalo** | - | 20 | - | - | - | 66 | - | 86 | 1.25 |
| **Cattle** | - | 2 | - | 39 | 257 | 39 | 3 | 340 | 4.93 |
| **Dog** | - | 8 | - | - | - | - | - | 8 | 0.12 |
| **Fox** | - | 12 | - | - | - | 6 | - | 18 | 0.26 |
| **Goat** | 39 | 26 | 10 | 281 | 11 | 1019 | 64 | 1449 | 21.02 |
| **Hare** | 10 | 30 | 36 | 46 | 74 | 174 | 14 | 383 | 5.56 |
| **Insect** | - | 18 | - | - | 44 | 1 | - | 63 | 0.91 |
| **Nilgai** | - | 4 | - | - | 63 | - | - | 67 | 0.97 |
| **Rodent** | 4 | 57 | 14 | 17 | 77 | 217 | 12 | 398 | 5.77 |
| **Sheep** | - | 2 | 33 | 121 | 10 | 670 | 62 | 898 | 13.02 |
| **Unidentified** | - | 5 | - | - | - | 1 | 1 | 7 | 0.10 |
| **Vegetative matter** | - | 3 | - | - | 31 | 586 | 22 | 642 | 9.31 |
| **Wildboar** | 56 | 10 | - | - | - | - | - | 66 | 0.96 |
| **Others** | 21 | 26 | 8 | 9 | - | - | - | 63 | 0.92 |
| **Reptiles/ Snakes** | - | 32 | - | - | - | 2 | - | 34 | 0.50 |
| **Jackal** | - | - | - | - | - | 5 | - | 5 | 0.07 |
| **Chinkara** | - | - | - | 37 | - | - | - | 37 | 0.54 |
|  |  |  |  |  |  |  | Total | 6893 | 100 |

To understand the food habits of Woolly and Indian wolves, we collected published data from different sources (detail provided in Table S1). Different studies presented results in various forms, such as absolute frequency and relative frequency. To reduce the effect of study-specific variability, we first calculated the number of food items in the number of scats (Table S2 and S3) and then calculated the relative frequency of occurrence (%RFO).

**Table S4:** Details of the cranial measurement used in study to compare the Indian wolf and Woolly wolf. All the measurements provided are in mm.

|  |
| --- |
| Woolly wolf |
| Locality | **Sex** | **Total Length** | **Cond Basal Length** | **Zygomatic Width** | **Mandibular Length** | **Interorbital Width** | **Post Orbital Width** | **Maxillary Width** | **pm4** | **m1** | **Reference** |
| Kashmir | Male | 239 | 225 | 133 | 178 | 44 | 42 | 44 | 25 | 28 | Pocock 1941 |
| Chitral | Male | 233 | 221 | 116 | 174 | - | - | 42 | 25 | 28 | Pocock 1941 |
| Gilgit | Male | 235 | 218 | 123 | 173 | 46 | 40 | 43 | 23 | 25.5 | Pocock 1941 |
| Salt Range | Male | 235 | 218 | 130 | 173 | 47 | 40 | 44 | 24 | 26 | Pocock 1941 |
| Chitral | Female | 239 | 220 | 127 | 171 | 46 | 40 | 48 | 23 | 27 | Pocock 1941 |
| Ladakh | Female | 220 | 197 | 124 | 156 | 40 | 36 | 41 | 21 | 25.5 | Pocock 1941 |
| Near Quetta | Female | 223 | 208 | - | 165 | 47 | 45 | 43 | 24 | 25 | Pocock 1941 |
| Pakistan Gilgit | NA | - | 234 | 135.47 | - | 45.51 | 39.55 | 46.7 | 24.59 | 28.73 | Srinivas and Jhala 2021 |
| Pakistan Chitral | NA | - | 224 | 135.63 | - | 45.05 | 40.48 | 41.63 | 22.86 | 25.73 | Srinivas and Jhala 2021 |
| India Ladakh | NA | - | 205 | 122.97 | - | 42.96 | 40.56 | 40.97 | 24.28 | 23.99 | Srinivas and Jhala 2021 |
| India Ladakh | NA | - | 198.27 | 119.66 | - | 40.8 | 41.84 | 39.42 | 23.94 | 25.99 | Srinivas and Jhala 2021 |
| - | - | 234 | 208 | 129 | - | - | - | 37 | - | 29.1 | Allen 1938 |
| - | - | 236 | 206 | 128 | - | - | - | 44 | - | 25.8 | Allen 1938 |
| Mean |  | 232.67 | 214.02 | 126.98 | 170.00 | 44.43 | 40.54 | 42.67 | 23.70 | 26.49 |  |
| SD |  | 6.69 | 11.15 | 6.12 | 7.30 | 2.47 | 2.27 | 2.89 | 1.17 | 1.54 |  |
| Indian wolf |
| Bikaner | Male | - | 212 | 131 | 175 | 40 | 40 | 41 | 22.5 | 25 | Pocock 1941 |
| Bikaner | Male | 229 | 209 | 126 | 166 | 41 | 37 | 41 | 23 | 25 | Pocock 1941 |
| Bajana | Male | 225 | 205 | 119 | 164 | 37.5 | 37 | 39 | 23 | 26 | Pocock 1941 |
| Hazaribagh | Male | 220 | 207 | 122 | 162 | 41 | 38 | 42 | 21 | 25 | Pocock 1941 |
| Hazaribagh | Male | 215 | 204 | 112 | 162 | 35 | 36 | 41 | 23 | 25 | Pocock 1941 |
| Hazaribagh | Male | 211 | 201 | 117 | 163 | 39 | 37 | 41 | 23 | 25 | Pocock 1941 |
| Bikaner | Female | 212 | 202 | 118 | 160 | - | - | 38 | 22 | 23 | Pocock 1941 |
| Bikaner | Female | 215 | 198 | 117 | 158 | 38 | 35 | 39.5 | 23 | 22 | Pocock 1941 |
| Jalandhar | NA | - | 209 | 108.38 | - | 34.79 | 37.84 | 38.64 | 21.38 | 25.92 | Srinivas and Jhala 2021 |
| Etawah | NA | - | 198 | 120.29 | - | 40.79 | 40.78 | 40.59 | 22.31 | 23.94 | Srinivas and Jhala 2021 |
| Etawah | NA | - | 205 | 127.85 | - | 43.18 | 40.96 | 42.75 | 22.51 | 25 | Srinivas and Jhala 2021 |
| Etawah | NA | - | 188 | 100.29 | - | 32.68 | 36.68 | 35.11 | 20.42 | 24.65 | Srinivas and Jhala 2021 |
| Gadag | Male | - | 212 | 121.74 | - | 41.4 | 38.89 | 41.82 | 22.16 | 24.21 | Srinivas and Jhala 2021 |
| Saran, Bihar | Female | - | 221 | 122.53 | - | 44.91 | 41.56 | 42.4 | 23.06 | 24.98 | Srinivas and Jhala 2021 |
| Gujarat | Male | - | 203.54 | 117.48 | - | 36.63 | 38.24 | 37.4 | 20.9 | 22.92 | Srinivas and Jhala 2021 |
| Gujarat | NA | - | 199.07 | 108.95 | - | 40.2 | 41.33 | 38.26 | 18.42 | 20.49 | Srinivas and Jhala 2021 |
| Gujarat | Male | - | 192.77 | 100.46 | - | 31.69 | 37.16 | 36.72 | 19.56 | 22.36 | Srinivas and Jhala 2021 |
| Gujarat | Female | - | 199.57 | 112.83 | - | 32.23 | 36.47 | 36.8 | 21.19 | 23.35 | Srinivas and Jhala 2021 |
| Gujarat | NA | - | 200.87 | 119.75 | - | 40.48 | 37.81 | 39.01 | 21.61 | 23.49 | Srinivas and Jhala 2021 |
| Gujarat | Male | - | 204.86 | 118.41 | - | 39.52 | 38.84 | 39.94 | 22.25 | 24.78 | Srinivas and Jhala 2021 |
| Mean |  | 218.14 | 203.58 | 117.05 | 163.75 | 38.42 | 38.24 | 39.60 | 21.81 | 24.10 |  |
| SD |  | 6.79 | 7.24 | 8.05 | 5.15 | 3.72 | 1.91 | 2.11 | 1.27 | 1.40 |  |



**Figure S1:** Details of the cranial measurement used in study to compare the Indian wolf and Woolly wolf on a representative canid skull.

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