

FIFTY YEARS (1920-1969) OF FAUNISTIC SURVEY OF RAJASTHAN (INDIA)*

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The political Rajasthan, to which this article is devoted, comprises erstwhile princely states. The rulers of most of these states were interested in wild life for the richness of game found in their areas. Only a few of them got a survey of faunistic wealth conducted. This, in addition to the extreme climate (arid or semi arid) and vast desert areas, seem to have served as restricting factors to attract the attention of earlier zoologists.

The faunistic survey of Rajasthan was done during the past fifty years (1920-1969) by institutions which can be grouped in two broad categories, viz., (i) Zoological Survey of India, and (ii) other organisations.

I. Surveys conducted by the Zoological Survey of India

It is a Government of India department established in the year 1916. The Zoological Survey of India started taking interest in Rajasthan (then Rajpootana) since 1941 when the late Dr. B. N. Chopra with Dr. M. L. Roonwal formed the first party to survey the fauna of Ajmer, Dungarpur, Jodhpur and Udaipur district. A concerted effort to have some comprehensive knowledge of the fauna of this area began in 1957 when its Director Dr. M. L. Roonwal, started sending survey parties for specialised collection. Ultimately, the Desert and Gangetic Plains Regional Station was established at Jodhpur in 1960. Since 1965 the Desert Regional Station has been separated from the Gangetic Plains Regional Station established at Patna. Details of the surveys so far conducted by the Zoological Survey are given below, indicating the leader of the party, the duration and areas covered by each party. Appendix 1 shows the main collecting localities visited by the Zoological Survey of India parties from 1941-1969.

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List of survey parties of the Zoological Survey:

1. Dr. B. N. Chopra, October-November, 1941, Ajmer, Dungarpur, Jodhpur and Udaipur districts.
2. Shri K. S. Pradhan, February-March, 1948, Jodhpur, Sirohi, and Udaipur districts.
3. Dr. B. Biswas, November, 1956-February, 1957, Bikaner, Churu, Jodhpur, Nagaur and Pali districts.
4. Dr. A. K. Mukherji, April-May, 1957, Ajmer, Jaipur (Sambhar Lake area) and Nagaur districts.
5. Dr. K. K. Tiwari, December, 1957-February, 1958, Barmer, Jaisalmer and Jodhpur districts.
6. Dr. A. K. Mukherji, November, 1957-January, 1958, Jaipur (Sambhar Lake area) and Jodhpur districts.
7. Dr. T. G. Vazirani, January-July, 1958, Jaipur (Sambhar Lake area), and Nagaur districts.
8. Dr. A. K. Mukherji, July, 1958, Nagaur (Gudah on Sambhar Lake) district.
9. Shri S. Biswas, August, 1958-January, 1959, Nagaur (Gudah on Sambhar Lake) district.
10. Shri R. K. Bhatnagar, June-August, 1960, Jodhpur district.
11. Dr. B. Biswas, August-November, 1960, Bikaner, Ganganagar, Jaisalmer, Jhunjhunu, Nagaur and Sikar districts.
12. Shri R. N. Bhargava, February-March, 1961, Barmer, Bundi, Jaisalmer, Jalore, Kotah, Pali and Udaipur districts.
13. Dr. A. K. Datta, July, November and December, 1961, Pali and Udaipur districts.
14. Dr. A. K. Datta, January, 1962, Bharatpur district.
15. Dr. K. K. Tiwari, January-February, 1962, Bharatpur district.
16. Shri K. K. Mahajan, February-April, 1962, Jaipur (Sambhar Lake area) and Jodhpur districts.
17. Dr. P. D. Gupta, September-November, 1962, Barmer, Bikaner, Jaisalmer and Jodhpur districts.
18. Shri R. N. Bhargava, June-July, 1963, Alwar, Jaipur, Jalore, Jhalawar, Kotah and Sawai Madhopur districts.
19. Shri K. K. Mahajan, 1963, Ajmer, Jaipur, Udaipur, Pali, Jodhpur and Bikaner districts.
20. Dr. V. C. Agrawal, March, 1964, Bhilwara, Chittorgarh, Dungarpur, Sirohi and Udaipur districts.
21. Shri K. K. Mahajan, September-October, 1964, Ajmer, Jaisalmer, Jodhpur, Sirohi and Udaipur districts.
22. Dr. P. D. Gupta, September-November, 1964, Ajmer, Chittorgarh, Kotah, Sirohi and Udaipur districts.
23. Shri S. Biswas, August-September, 1965, Ajmer, Bhilwara, Chittorgarh, Kotah, Sirohi and Udaipur districts.

24. Shri Bhola Nath, February, 1966, Kalibangan, Bikaner district, Prehistoric remains of animals.
25. Dr. P. D. Gupta, October, 1966, Barmer, Bikaner and Jaisalmer districts.
26. Dr. P. D. Gupta, February, 1969, Alwar, Bharatpur, Jaipur and Tonk Districts.
- 27 Regular local survey parties of the Desert Regional Station, Zoological Survey of India, Jodhpur, 1960—upto date, around Jodhpur.

The results of studies of the material collected by these parties led by experts on various groups of animals are in press in a serial form known as "Fauna of Rajasthan, India" (since reading of this paper a number of publications have come out) in the *Records of the Zoological Survey of India*, volume 61 onwards.

II. *Surveys conducted by other agencies*

Following surveys have been conducted by individuals or organisations.

1. Shri H. Whistler (1938) studied birds from Marwar (within Jodhpur State) (now Jodhpur district).
2. Forest Research Institute, Dehradun under Dr. M. L. Roonwal, July-September, 1952, Ajmer, Bikaner, Bundi, Jaipur, Jodhpur, Kotah, Pali and Sawai Madhopur districts.
3. Zoology Department, University of Jodhpur, for free living and plant parasitic nematodes (1965-69).
4. Zoology Department, University of Rajasthan, then located at Jodhpur (1955-60) for reptiles and mammals of western Rajasthan.
5. Bombay Natural History Society organised two surveys of the area (i) From 1911-1929 in connection with its Mammal Survey of India, Burma and Ceylon and (ii) From 1967 onward for migratory birds at Ghana Sanctuary in Bharatpur District.
6. Agricultural Zoology Department, University of Udaipur (1960-64) dealt with mostly insect fauna of Udaipur district.
7. Zoology Department, Birla Institute of Technology and Science, Pilani concentrated its efforts for crustacean and insect fauna of Pilani in Jhunjhunu District.

Jerdon's (1862) account of birds of this area, appears to be the pioneer in the field of Rajasthan zoology. Subsequent to Adams (1899) we find a gradual but sporadically increasing number of references on the fauna of Rajasthan. Recently Gupta (1968 and in press) has reviewed the knowledge about faunal composition of this state, and he has pointed to the groups of animals which have not yet received any attention of zoologists and such other groups which are lesser known from the area.

Impey (1862) was the first author to deal with fossils from this state. He recorded a few ammonites from Jaisalmer area. During this period

of more than a century further fossils have been collected and studied mostly from western districts. These fossils belong to Foraminifera, Ostracoda, Mollusca, Brachiopoda, Echinoidea, Decapoda, Pisces, etc. A paper by this author dealing with a systematic list of the known species along with their geographical and geological distribution is in press.

In order to preserve the coherency of the knowledge about various groups of animals, the account of the living fauna is followed by that of fossils within each group.

Since reading of this paper a number of publications mentioned originally in press have come out. To preserve the originality of text, no change has been made in the text and in the list of references but such references have been marked with an asterisk and completed by giving full details of the publication.

1. *Protozoa*

Bhatia (1936, 38) has reported Ciliophora and Sporozoa respectively then known from the area. Misra (1960) has studied the incidence of opalinids in monitor lizard, *Varanus monitor* Linn., from Bikaner. Mahajan (in press a, b) has contributed to the knowledge of Sarcodina, Flagellata and Ciliata.

Fossil Foraminifera from Bikaner district have been studied by Jacob and Sastri (1950), Jacob, Sastri and Sastri (1952), Singh (1951-57), West (1949), Pascoe (1963) and Bhatia and Khosla (1968). Siddiquie and Iqbaluddin (1963), Siddiquie and Bahl (1965) and Barooah (1946) have recorded a few forms from Barmer district. Chatterji (1960), Hoffman (1962), Poddar (1963), Singh (1955), Subbotina, Datta and Srivastava (1960), Khosla (1967) and Pascoe (1963) devoted their attention to the Foraminifera from Jaisalmer district. As a result of these works more than a dozen new species have been described.

2. *Porifera*

Since Annandale (1911) no further reference is available. However a few unidentified fossil forms have been reported from Jaisalmer by Subbotina, Datta and Srivastava (1960).

3. *Coelenterata*

Unidentified fossil corals were recorded from Kuldhar (Jaisalmer district) by Lubimova, Guha and Mohan (1960).

4. *Bryozoa*

A fossil form, *Polypora ampla* has been reported from Bap (Jodhpur District) by Shah (1963) and other unidentified forms from Jaisalmer by Subbotina, Datta and Srivastava (1960).

5. *Platyhelminthes*

Trematoda: Gupta & Agrawal (1967) have described *Halipegus udaipurensis*. Gupta (in press) has studied these parasites from western Rajasthan.

Cestoda: Southwell (1930 a, b) has included some of the species found in Rajasthan. Rathore, Mathur and Sankarnarayan (1955) have studied cestodes of sheep in Rajasthan. Mukherjee (in press) has given an account of these parasites from western Rajasthan.

6. *Nemathelminthes*

Baylis (1936, 1939) has mentioned many species from this area. Rathore, Mathur and Sankarnarayan (1955) have studied nematodes from sheep. Prakash and Sharma (1955) reported the mortality of hedgehogs due to *Trichinella* sp. at Jodhpur. Recently Johnson (1965, 66) has studied nematode parasites of animals. Prasad, Mathur and Sehgal (1959) reported nematodes causing the Molya disease of wheat and barley. Khera (1965-67) has contributed to the knowledge of free living nematodes; Tikyani and Khera (1968 a, b), Tikyani Khera & Bhatnagar (in press) and Kumar and Khera (in press) have studied the nematode parasites of plants. Yadav and Naik (1966) studied the nematodes associated with economic plants of south eastern Rajasthan. Nama and Tikyani (1968) have studied nematodes of certain vegetables of Jodhpur.

7. *Annelida*

Chaetopoda: A few species of earthworms have been recorded by Stephenson (1923).

Hirudinea: Harding & Moore (1927) have described leeches from Rajasthan.

A fossil polychaet, *Nereites* sp. has been recorded from Jaisalmer by Gupta, Srivastava and Agrawal (1966).

8. *Arthropoda*

Crustacea

Lindberg (1942) has studied crustacea of Jodhpur. Brehm (1951) dealt with the fresh water forms. Mathur and Sidhu (1957) reported the occurrence of the genus *Apus* (Notostraca) from Pilani, Sidhu (1959) gave a list of additional forms found near Pilani. Tiwari (1952) has described two new species of the genus *Apus* from southern Rajasthan and he (1959 & 1962b) has described certain other aquatic forms. Ramakrishna (1951) has reported the occurrence of *Paratelphusa* (*Barytelphusa*) *jacquemontii* Rathbum., from Dungarpur. Baid (1958) reported *Artemia salina* from Sambhar lake. Biswas (in press) has studied Cladocera of Rajasthan.

Fossil Ostracoda: Barooah (1946) reported *Cythercis* sp. from Nagurda in Barmer district. Jacob and Sastri (1950) studied these forms found in Fuller's earth at Marh near Bikaner. Jacob, Sastry and Sastri (1952) reported a few species from gypsum mines at Jamsar in Bikaner district. Lubimova, Guha and Mohan (1960) studied the material from a few places in Jaisalmer district. Poddar (1963) reported a few species from Kuiala formations near Jaisalmer. Subbotina, Datta and Srivastava (1960) recorded certain unidentified forms from Jaisalmer area.

Fossil Decapoda: Barooah (1950) and Kaul (1951) reported certain unidentifiable forms from Kapurdi. Prasad (1961) reported *Penaeus kapurdi* and Tiwari (1963) has described *Penaeus barmerensis* and *P. glaessneri*. *Goniocypoda rajasthanica* has been reported from Kapurdi by Glaessner and Rao (1960) and Tiwari (1962a).

Arachnida

Sharif (1928) studied Ixodidae from this area. Tilak (1964) reported *Crossopriza iyoni*, a six legged spider from Pilani. Tikadar (1966) has described three new species of spiders and reported the occurrence of ten other species.

Insecta

General: Mathur, Menon and Rao (1956) and Baid (1959) have studied insect fauna of Pilani. Kundu, Datta Gupta and Gupta (1961) have studied the insect fauna collected with light traps at Pilani. Srivastava (1959) has studied insect pests of maize.

Orthoptera: Dirsh (1951) reported an injurious grasshopper from Ajmer. Venketesh (1968) has given an account of grasshoppers and locusts found in Rajasthan.

Isoptera: Kushwaha (1960 a, b) reported the results of his termite survey around Udaipur. Roonwal and Bose (1960-69) have given a good account of termites of Rajasthan.

Odonata: Fraser (1921-36) has included material from this area along with that of other parts of India.

Thysanoptera: Beeson (1941) has given some information about this group of insects found in Rajasthan. Singh (1950) studied these insects from Ajmer. Ananthakrishnan (1954) provides an account of Thysanoptera of Udaipur. Bhatti (1962, 67) has described *Hyalopterothrips roonwali* and *Indothrips bhushani* respectively from Jodhpur.

Hemiptera: Kumar (1959) reported *Urentius* species from Pilani. Joseph (1961) studied *Sardia rostrata* Melichor from Ajmer and Mt. Abu. Behura (1963) while summarizing the knowledge of Indian aphids has included those from Rajasthan. Srivastava and Vaish (1964) have reported *Hemaspidopectus cinereus* Green, a coccid pest of guava from Ajmer, Jaipur and Bharatpur districts.

Lepidoptera: Bell (1909-25) has dealt in detail with the butterflies of India including those from Rajasthan. Bell and Scott (1937) have

similarly dealt with the moths. Macpherson (1927) has described butterflies of Jodhpur and Mt. Abu. Talbot (1939, 47) has again included butterflies of this area. Srivastava (1958) reported a new cut-worm pest of potato. Kushwaha (1960) has given an account of lepidopteran fauna of Udaipur. Mathur and Chempakvalli (1961) studied the butterflies of Pilani. Kushwaha, Sharma and Sharma (1964) recorded the occurrence of *Chlumetia transversa* Walker (Noctuidae) a pest of mango at Udaipur.

Coleoptera: Acharya (1938) studied the distribution of *Sternocera nitidicolis* (Fam. Bupoestidae) from Mt. Abu, in Rajasthan and Gujarat. Vazirani (1958) reported a few species belonging to family Grynidae. Kushwaha and Sharma (1961) have studied beetle predators of Udaipur. Srivastava (1961) reported the Lucerne Weevil, *Hypera variabilis* (Hbst.) from south-eastern Rajasthan. Recently, Vazirani (1969 & in press) has studied Dytiscidae beetle fauna of this State. Kapur and Bhaumick (1966) have recorded four species of ladybird beetles one of which is a new record from Indian region.

Hymenoptera: The available references of this group of insects from Rajasthan deal with the period earlier to that under review.

Diptera: The volumes on "*Fauna of British India*" by Brunetti (1920, 23) on Brachycera, and Pipunculidae, Syrphidae, etc., Christophers (1933) on Anophelini, and White, Aubertin and Smart (1940) on Calliphoridae include the material then known from Rajasthan.

9. *Echinodermata*

Fossil Asteroidea: An unidentified form has been reported from Ramgarh by Gupta, Agrawal and Srivastava (1967).

Fossil Echinoidea: The echinoids of Jaisalmer have been studied by Singh (1955), Sahni and Bhatnagar (1958) and Hoffman (1963). Gee (1931), West (1949) and Pascoe (1959) have reported a few species from Marh in Bikaner District. Unidentified forms have been recorded from Kapurdi (District Barmer) by Ghosh (1952) and Tiwari (1962a).

Fossil Crinoidea: Shah (1963) has reported unidentified crinoid stems from Bap.

Fossil Hotothuroidea: Unidentified spines were recorded from Jaisalmer by Subbotina, Datta and Srivastava (1960).

10. *Mollusca*

Gude (1921) has included the material from this state. Recently Ray and Mukherjee (in press) have studied the molluscs of the area.

Fossil Mollusca: Gastropoda have been studied from Bap (Shah, 1963), Dholpur (Pascoe, 1963), and Jaisalmer district by (Hoffman, 1963 and Misra, Srivastava and Jain (1961); and from Marh by West (1949). Lamellibranchia have been studied from Bikaner district by West (1949); from Barmer district by Barooah (1946), Siddiquie and Iqbaluddin (1963), Siddiquie and Bahl (1965) and Tiwari (1966); from Jaisalmer district by Pascoe (1959) and from Dholpur district by Pascoe (1963).

Cephalopoda have been studied from Jaisalmer district by Hoffman (1963), Pascoe (1959), Richter-Bernberg and Schott (1963), Spath (1933), Sahni and Bhatnagar (1958). A single record of *Dentalium* sp. of Scaphopoda is available from Marh (West, 1949).

11. Brachiopoda

They are known only through fossils from Jaisalmer district and have been studied by Hoffman (1963), Sahni and Bhatnagar (1955, 58) and Pascoe (1959).

12. Chordata

12a. Pisces

Hora and Mathur (1952) studied the Palaeo-geographical features of Rajasthan as evidenced by the distribution of fishes. Mathur (1952) contributed to the knowledge of fishes of southern Rajasthan. Krishna and Menon (1958) reported eleven species from Jodhpur. Datta Gupta *et al.* (1961) studied fishes from lakes of this state. Moona (1962) reported 22 species from Bharatpur district. Datta and Majumdar (in press) have studied the fishes of Rajasthan. Mathur and Yazdani (in press) have described *Noemacheilus rajasthanicus* a new species of loach from Jodhpur, and they have separately (in press) recorded *Aplocheilus blochi* (Arnold). Yazdani and Bhargava (in press) have reported *Aphanius dispar* (Ruppell) from Jodhpur district.

Fishes are the highest fossilised organism known mostly through unidentified forms reported by Barcoah (1950), Glaessner and Rao (1960), Kaul (1951), and White (1952). Tiwari (1969) has described *Kapurdia bhargavai* from Fuller's earth of Kapurdi in Barmer district.

12b. Amphibia

McCann (1932) reported some of the Amphibia from this area. Recently Mansukhani, and Murthi (in press) reported altogether eight species found in Rajasthan.

12c. Reptilia

Wall (1922) reported the occurrence of *Amblycephalus monticela* near Jaipur and in (1923-25) gave a hand list of snakes including those found in Rajasthan. Krishna and Dave (1956-61) have dealt with the distribution of reptiles found in desert areas of this state. Sunder Singh (1960) studied Ophidia of Pilani.

12d. Aves

Stables (1923) reported *Anas platyrhynchos*. Home (1926) recorded *Anas brachyrhynchus* and *A. boscas* from Jaipur. Prater (1926) reported Pallas' Sandgrouse, *Syrhaptes paradoxurus* from Bikaner. Simmons (1930) observed pied crested cuckoo, *Coccyzus jacobinus* at Ajmer. Acharya

(1931) reported *Clamator jacobinus* Boddaert from northern Gujarat and Rajasthan. Briggs (1932) observed *Tchitrea paradisi*. Singh (1933) recorded Great Crested Grebe, *Podiceps c. cristatus* from Bikaner. Whistler (1938) reported the results of an Ornithological Survey of Jodhpur State.

Lowther (1942-44) has studied some birds found in U.P. and Rajasthan. The Private Secretary to His Highness the Maharaja of Bikaner (1946) reported *Anser fabilis* Barllon from Bikaner. Battye (1947) recorded *Falco jugger* Gray from Mt. Abu. Simmons (1948) reported the occurrence of Cuckoo-shrike, *Lalage sykesii* from Mt. Abu and Ajmer. Biswas (1949) has studied birds of southern Rajasthan. Shivrajakumar (1949) reported woodcock, *Scolopax rusticola* Linn. from Mt. Abu. Grubh, Panday and Shekar (1968a, b) reported *Halcyon pileata* and Greywinged Blackbird, *Turdus bouboul* from Bharatpur. Grubh (1968) has extended the distribution of Greyheaded Lapwing, *Vanellus cinereus* (Blyth) to Rajasthan.

12e. *Mammalia*

Thomas (1923) studied mongoose and rats of the area. Livesay (1922) reported a lion being shot near Kotah. Lindsay (1929) has given the results of his studies on the shrews collected by Mammal Survey of India parties.

Pocock (1936, 37, 40) dealt with foxes, mongoose and otters respectively from this area. Singh (1946) reported the occurrence of an albino boar from Udaipur. Krishna and Prakash (1955) studied distribution of hedgehogs. Gee (1958) has studied 'wild' cattle of Bharatpur. Prakash (1958) dealt with extinct and vanishing mammals of Rajasthan and problems of their preservation. Prakash (1960, 63a, 63b) dealt with the systematics and zoogeography of mammalian fauna of this area.

Recently Gupta and Agrawal (1966) reported Indian hairy-footed gerbill, *Gerbillus gleadowi* Murray from Kolayat, Sikar and Jodhpur. Agrawal (1967) has recorded *Rattus (Millardia) gleadowi* (Murray) and *Pipistrellus dormeri caurinus* (Thomas) from Jodhpur. Prakash and Jain (1967) reported occurrence of *Rattus meltada* Gray and *Gerbillus dasyurus* from Jodhpur. Biswas and Ghosh (1968) have recorded *Pipistrellus mimus mimus* Wroughton and *Herpestes edwardsi nyula* Hodson from this State.

CONCLUSION

A review of the literature reveals two types of faunistic surveys which need attention of workers on the fauna of Rajasthan. The first category is of those groups of animals like Turbellaria, Monogenetic Trematodes, Acanthocephala, Acarina, Myriapoda and certain orders of Insecta such as Mallophaga, Collembola, etc., which have remained untouched so far. These animals need immediate attention of zoologists. The second category of animals includes such groups like mammals, fishes, reptiles, helminths (digenetic trematodes, cestodes and nematodes) etc., which have been studied from parts of this State but

in order to have a complete picture about the group they should be studied from areas bordering other states. This type of work is likely to reveal the richness of the variety existing in various ecological regions of Rajasthan which has terrains ranging from desert in western parts to hilly and forest areas in southern and south eastern parts. The eastern districts forming the catchment areas of River Yamuna form an ecological area of their own.

Also there is a possibility of getting interesting results from the survey of fauna existing in deep-wells with water level at depths of 80-150 metres. Such wells are found in western districts of Barmer, Bikaner and Jaisalmer. Existence of aquatic life has been confirmed by this author (unpublished).

Attention has also been invited of palaeontologists to the lesser known fossil animal groups like Bryozoa, Coelenterata, Echinodermata and Pisces. A detailed study of these forms should reveal information which could be interesting to both the palaeontologists and the zoologists.

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APPENDIX I

List of main localities surveyed by the Zoological Survey of India parties (1941-1969).

<i>Sl. No.</i>	<i>Collecting station</i>	<i>Approximate latitude (N.)</i>	<i>Approximate longitude (E.)</i>
1. AJMER DISTRICT			
1.	Ajmer	26°27'	74°42'
2.	Anasagar Lake, Ajmer	26°25'	74°35'
3.	Bir Tank	26°24'	74°44'
4.	Danta Forest	26°20'	74°40'
5.	Kishangarh	26°35'	74°50'
6.	Motisar	26°28'	74°31'
7.	Nasirabad	26°11'	74°28'
8.	Panch Kund	26°29'	74°34'
9.	Pushkar	26°32'	74°35'
10.	Rajosi	26°20'	74°40'
11.	Raoli	25°46'	73°59'
12.	Sanod Tank	26°17'	74°50'
2. ALWAR DISTRICT			
13.	Agyarah Dam	27°31'	76°45'
14.	Alwar	27°34'	76°36'
15.	Bedkesharpur	27°10'	76°38'
16.	Jaisamand	27°25'	76°36'
17.	Jeysagar	27°10'	76°36'
18.	Mansarovar	27°15'	76°36'
19.	Sariska	27°24'	76°24'
20.	Siliserh	27°25'	76°36'
3. BARMER DISTRICT			
21.	Balasar	26°07'	71°08'
22.	Balotra	25°50'	72°15'
23.	Barmer	25°45'	71°23'

<i>Sl. No.</i>	<i>Collecting station</i>	<i>Approximate latitude (N.)</i>	<i>Approximate longitude (E.)</i>
24.	Bhap Tank	25°51'	71°26'
25.	Bisu	26°18'	71°21'
26.	Datani Village	25°48'	70°46'
27.	Gadra Road	25°45'	70°35'
28.	Jhalon Forest	25°50'	70°45'
29.	Kapurdi	25°50'	71°20'
30.	Luni River (Near Balotra)	25°45'	72°15'
31.	Neemla	26°03'	71°20'
32.	Pachpadra Salt Depot	25°55'	72°20'
33.	Ranasar	25°50'	70°44'
34.	Sura	25°55'	71°05'
35.	Tamlor	25°44'	70°33'
36.	Uttarlai	25°45'	71°25'

4. BHARATPUR DISTRICT

37.	Badalgarh	26°52'	77°15'
38.	Baretha	26°54'	77°22'
39.	Bharatpur (Ghana Sanctuary)	27°15'	77°27'
40.	Dig Fort	27°27'	77°20'
41.	Gundgaon	27°42'	77°14'
42.	Kherli village	27°00'	77°15'
43.	Nekpur Head	27°06'	77°24'
44.	Seola Head Works on River Gambhir	26°59'	77°22'
45.	Sheetla	27°39'	77°15'

5. BHILWARA DISTRICT

46.	Pandal or Mandal Tank	25°25'	74°34'
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6. BIKANER DISTRICT

47.	Bikaner	28°01'	73°22'
48.	Gajner	27°55'	73°04'
49.	Jhajju	27°46'	73°00'
50.	Jorbir	27°58'	73°14'
51.	'Khans' West of Bikaner	28°06'	73°14'

<i>Sl. No.</i>	<i>Collecting station</i>	<i>Approximate latitude (N.)</i>	<i>Approximate longitude (E.)</i>
52.	Khetolai	27°44'	72°55'
53.	Kodamdesar	28°00'	73°05'
54.	Kolayat	27°50'	72°58'
55.	Marh	27°52'	72°57'
56.	Nayagaon	27°58'	72°57'
57.	Palana	27°50'	73°15'
58.	Pugal	28°30'	72°48'
59.	Siasar	28°35'	72°34'
60.	Sobasar	28°08'	73°10'

7. BUNDI DISTRICT

61.	Bardah-ka-Talab	25°20'	75°40'
62.	Bundi	25°27'	75°41'
63.	Khatkar	25°34'	75°46'
64.	Phulsagar	25°25'	75°55'

8. CHITTORGARH DISTRICT

65.	Berach River	24°50'	74°37'
66.	Chittorgarh	25°00'	74°45'
67.	Chittorgarh Rly. Station	24°53'	74°37'
68.	Confluence of R. Berach & R. Gambhiri	24°55'	74°38'
69.	Gambhiri River South of Fort	24°51'	74°39'
70.	Manpura	24°51'	74°27'
71.	Zalimpura	24°48'	74°38'

9. CHURU DISTRICT

72.	Churu	28°11'	75°06'
73.	Hudera Rly. Station	28°00'	74°35'
74.	Rattangarh Rly. Station	28°07'	74°35'
75.	Sardarshahar	28°30'	74°29'
76.	Taranagar town	28°40'	75°02'

10. DUNGARPUR DISTRICT

77.	Dungarpur	23°50'	73°40'
78.	Som River	24°00'	73°40'

<i>Sl. No.</i>	<i>Collecting Station</i>	<i>Approximate latitude (N.)</i>	<i>Approximate longitude (E.)</i>
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11. GANGANAGAR DISTRICT

79.	Asarjana	29°10'	74°38'
80.	Badbirana	29°08'	74°53'
81.	Deidas	29°16'	74°41'
82.	Diplana	29°11'	74°53'
83.	Guria	29°18'	74°54'
84.	Kishanpura	29°19'	73°58'
85.	Nohar	29°11'	74°46'
86.	Padampura	29°18'	74°56'
87.	Rangmahal	29°21'	73°58'
88.	Sardarpurabas	29°10'	74°48'
89.	Suratgarh	29°19'	73°54'
90.	Surpura	29°05'	74°50'

12. JAIPUR DISTRICT

91.	Achnol forest	27°05'	75°52'
92.	Asalpur Dam	26°52'	75°26'
93.	Bagru	26°50'	75°32'
94.	Bahadurpur	26°52'	75°16'
95.	Chittoli Bund	27°42'	76°10'
96.	Dausa	26°55'	75°20'
97.	Devdyani	26°55'	75°13'
98.	Dudu	26°40'	75°10'
99.	Galta	27°00'	75°52'
100.	Gudha near Sambhar lake	26°55'	75°25'
101.	Jaipur and vicinity	26°55'	75°52'
102.	Jamwa Ramgarh	27°10'	76°05'
103.	Kotputli-ka-Talao	27°42'	76°12'
104.	Kukus	27°03'	75°55'
105.	Lihorana	27°02'	75°25'
106.	Manoharpur	27°18'	75°57'
107.	Naraina village	26°45'	75°10'

<i>Sl. No.</i>	<i>Collecting Station</i>	<i>Approximate latitude (N.)</i>	<i>Approximate longitude (E.)</i>
108.	Padasauli	26°35'	76°20'
109.	Phulera	26°52'	75°16'
110.	Sambhar	26°54'	75°13'

13. JAISALMER DISTRICT

111.	Badebagh	26°55'	71°00'
112.	Balana	27°15'	71°20'
113.	Biprasar	27°18'	70°30'
114.	Devikot	27°42'	71°12'
115.	Geodesar or Jaidesar	27°16'	70°32'
116.	Jaisalmer and vicinity	26°55'	70°57'
117.	Jedbaisar	26°54'	71°10'
118.	Josirasar	26°55'	71°00'
119.	Khejadi area	27°29'	70°22'
120.	Madanganj	27°55'	70°35'
121.	Mohangarh	27°20'	71°15'
122.	Mulasagar	26°55'	70°50'
123.	Nokh	27°33'	72°15'
124.	Pariwar	27°12'	70°40'
125.	Pokaran	26°55'	71°56'
126.	Rama	26°33'	71°00'
127.	Ramgarh	27°23'	70°30'
128.	Sanu	27°13'	70°35'

14. JALORE DISTRICT

129.	Dadli-ka-Talao	25°00'	72°16'
130.	Jalore town	25°22'	72°58'
131.	Jaswantpura	24°50'	72°15'
132.	Sagi River	24°50'	72°15'

15. JHALAWAR DISTRICT

133.	Ahu River	24°20'	76°05'
134.	Aklera	24°20'	76°30'

<i>Sl. No.</i>	<i>Collecting Station</i>	<i>Approximate latitude (N.)</i>	<i>Approximate longitude (E.)</i>
135.	Chandra Sarovar	24°36'	76°10'
136.	Gaduli Talai (Tank)	24°40'	76°30'
137.	Gomti Sagar	24°34'	76°10'
138.	Mudlia Kheri (Jhalrapatan)	24°32'	76°10'
139.	Shergarh	24°40'	76°30'
140.	Sunel	24°20'	76°05'

16. JHUNJHUNU DISTRICT

141.	Alsisar	28°19'	75°18'
142.	Bagar	28°11'	75°30'
143.	Basni	28°14'	75°20'
144.	Desusar	28°12'	75°28'
145.	Jhunjhunu	28°06'	75°24'
146.	Malsidar	28°21'	75°18'
147.	Mandawa	28°03'	75°09'
148.	Pura-ki-Dhani	28°05'	75°22'

17. JODHPUR DISTRICT

149.	Agolai	26°15'	72°35'
150.	Akhrajji-ka-Talab	26°15'	72°53'
151.	Balsamand	26°18'	73°04'
152.	Bariganga (Beriganga)	26°25'	73°04'
153.	Barli Tank	26°26'	72°55'
154.	Basni village	26°18'	72°50'
155.	Bisalpur Dam	26°18'	73°27'
156.	Bishalpur	26°10'	73°15'
157.	Hanwant village	26°15'	72°48'
158.	Jodhpur and vicinity	26°18'	73°04'
159.	Kaylana Desert Afforestation Demonstration Station	26°15'	72°45'
160.	Kaylana Desert Control Demonstration Station	26°18'	72°59'
161.	Khokhra village	26°28'	73°05'
162.	Kolū	26°56'	72°17'

<i>Sl. No.</i>	<i>Collecting Station</i>	<i>Approximate latitude (N.)</i>	<i>Approximate longitude (E.)</i>
163.	Kutri Bhensar	26°24'	72°41'
164.	Loridi village	26°22'	72°53'
165.	Luni	26°18'	72°38'
166.	Mataji-ki-Bhakari	25°58'	73°04'
167.	Nandri village	26°15'	73°05'
168.	Nettra	26°20'	73°15'
169.	Phalodi	27°09'	72°24'
170.	Pipar city	26°34'	73°10'
171.	Pipar Road village	26°34'	73°04'
172.	Ranisar	27°13'	72°43'

18. KOTAH DISTRICT

173.	Alani tank	25°00'	75°03'
174.	Chitenpur (Forest School)	25°05'	75°52'
175.	Chambal Barage	25°12'	75°51'
176.	Dadhdevi	25°03'	75°55'
177.	Darah	24°49'	76°02'
178.	Jagupura	24°55'	76°35'
179.	Kolipura	24°55'	75°40'
180.	Kotah Town	25°10'	75°52'
181.	Mandana	24°56'	75°55'
182.	Morak	24°45'	75°55'
183.	Palaita	25°05'	76°10'
184.	Umedganj	25°05'	75°55'

19. NAGAUER DISTRICT

185.	Balaia	27°03'	73°40'
186.	Barni	27°11'	73°37'
187.	Bhakrod	27°03'	73°36'
188.	Chhapparwara (37 km.S. of Sambhar)	26°55'	75°02'
189.	Didia	27°07'	73°55'
190.	Gogolaj	27°15'	73°39'

<i>Sl. No.</i>	<i>Collecting Station</i>	<i>Approximate latitude (N.)</i>	<i>Approximate longitude (E.)</i>
191.	Gurha	27°13'	73°29'
192.	Harsnath	27°03'	75°12'
193.	Imirti	27°06'	73°39'
194.	Merta city	26°35'	74°06'
195.	Nagaur	27°11'	73°41'
196.	Nandana Nadi	27°00'	75°00'
197.	Parli	27°03'	73°38'
198.	Rol Quazian	27°09'	73°56'
199.	Sanodia	26°55'	74°55'
200.	Sarau	27°15'	73°44'
201.	Singar	27°13'	73°37'

20. PALI DISTRICT

202.	Aravalli Hills base ca. 12 km. from Sadri	25°04'	73°25'
203.	Awa village	25°45'	73°50'
204.	Erinpura	25°29'	73°04'
205.	Falna	25°10'	73°10'
206.	Marwar	25°45'	73°38'
207.	Pali	25°46'	73°25'
208.	Phulad Rly. Station	25°35'	73°48'
209.	Pipli	25°55'	73°45'
210.	Sadri and vicinity	25°10'	73°25'
211.	Saran village	25°29'	73°47'
212.	Sardar Samand	25°54'	73°25'

21. SAWAI MADHOPUR DISTRICT

213.	Bhagwatigarh Bund	25°58'	76°23'
214.	Hindaun	26°45'	77°02'
215.	Karauli	26°30'	77°02'
216.	Mui Bund	26°00'	76°23'
217.	Sawai Madhopur	25°58'	76°30'
218.	Srimahabirji	26°40'	76°55'
219.	Surwal Bund	26°00'	76°21'

<i>Sl. No.</i>	<i>Collecting Station</i>	<i>Approximate latitude (N.)</i>	<i>Approximate longitude (E.)</i>
22. SIKAR DISTRICT			
220.	Chokha-ka-Bas	27°29'	75°08'
221.	Dadhia	27°35'	75°14'
222.	Gotera	27°44'	75°10'
223.	Gungara	27°41'	75°17'
224.	Kadma-ka-Bar	27°30'	75°08'
225.	Kasli	27°33'	75°10'
226.	Khori	27°31'	75°04'
227.	Molasi	27°36'	75°00'
228.	Mundaora	27°29'	75°05'
229.	Phagalwa	27°38'	74°59'
230.	Piprali	27°38'	75°16'
231.	Puran Bari	27°31'	75°06'
232.	Puran Chhoti	27°31'	75°05'
233.	Purat-ki-Dhani	27°38'	75°18'
234.	Rashidpura	27°43'	75°05'
235.	Sikar and vicinity	27°38'	75°08'
23. SIROHI DISTRICT			
236.	Achalgarh	24°38'	72°46'
237.	Akrabhata	24°31'	72°48'
238.	Anadra Point	24°38'	72°39'
239.	Mount Abu	24°35'	72°45'
240.	Nakki Lake	24°34'	72°42'
24. TONK DISTRICT			
241.	Banas River (near Tonk)	26°11'	75°52'
25. UDAIPUR DISTRICT			
242.	Balicha	24°20'	73°40'
243.	Banas River near Nathdwara	24°57'	73°49'
244.	Barapal village	24°20'	73°35'
245.	Bhupalsagar	24°35'	73°40'

<i>Sl. No.</i>	<i>Collecting Station</i>	<i>Approximate latitude (N.)</i>	<i>Approximate longitude (E.)</i>
246.	Dewali	24°36'	73°38'
247.	Fatchsagar	24°35'	73°35'
248.	Game Sanctuary near Jaisamand	24°55'	73°35'
249.	Jogmande Jharna	25°35'	74°00'
250.	Kotra	24°22'	73°13'
251.	Madri	24°30'	73°40'
252.	Nethala Tank	24°54'	73°42'
253.	Parshad	24°12'	73°43'
254.	Udaipur	24°35'	73°42'
255.	Vithal Niwas	25°05'	73°50'
256.	Madar Tank	24°40'	73°37'
