The Arctic and Antarctic: their division into geobotanical areas

XXIX KOMAROV LECTURE PRESENTED 14 OCTOBER 1974

The Arctic and Antarctic: their division into geobotanical areas

V. D. ALEKSANDROVA

V. L. Komarov Botanical Institute of the Academy of Sciences of the USSR

TRANSLATED BY DORIS LÖVE

CAMBRIDGE UNIVERSITY PRESS

Cambridge

London New York New Rochelle

Melbourne Sydney

CAMBRIDGE UNIVERSITY PRESS
Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, São Paulo, Delhi

Cambridge University Press
The Edinburgh Building, Cambridge CB2 8RU, UK

Published in the United States of America by Cambridge University Press, New York

www.cambridge.org
Information on this title: www.cambridge.org/9780521114264

First published in Russian as
Геоботаническое районирование Арктики и Антарктики.
by Nauka, Leningrad, 1977
English translation first published 1980

This digitally printed version 2009

A catalogue record for this publication is available from the British Library

ISBN 978-0-521-23119-0 hardback
ISBN 978-0-521-11426-4 paperback

CONTENTS

TRANSLATOR'S FOREWORD

The landmass of the USSR is enormous and its 'Arctic' alone spans over 150° of longitude from the Atlantic to the Pacific and reaches latitude 82° N at its northernmost point on Franz Joseph's Land. It is, however, fairly well explored, from the point of view of both flora and vegetation.

It may come as a surprise to some readers that much of this exploration has been done by dedicated women scientists, who alone or together with male colleagues have braved much danger, hardship and the rigors of extreme climates. One of them is Vera Danilovna Aleksandrova, who has devoted a lifetime to the study and investigation of the flora and vegetation of arctic lands far above the Polar Circle. The present volume is, thus, to a great extent based on her personal experience, but also on her intimate knowledge of the literature on arctic areas inside and outside the USSR, and on the Antarctic. I hope that my translation will be useful to students of arctic and antarctic vegetation, not able themselves to cope with the Russian language.

The translation has been made as faithful to the original as possible. Nothing has been omitted, and only a few minor revisions have been made by the author, who has approved the translation. The Russian units of classification used in this book have been published previously by Aleksandrova (1973).

The transliteration of personal and geographical names as well as the titles in the bibliography follows the recommendations of Gregory Razran (1959) in *Science*, (**129**, 1111–13). It is a simple and straightforward system, as close to the phonetics of the Russian language as English pronunciation can get. It does not have the cumbersome superscripts and ligatures of the Library of Congress system and is

therefore easier both to read and to pronounce. It should be noted that the Russian letters ь and ъ are given as ′ and ″, respectively. In the few cases where Russian authors have published in books or journals abroad and their names have been spelled differently from my spellings, I have listed both types of names in the bibliography (e.g. Trautfetter *see* Trautvetter, etc), but in the text only Razran's system is used.

The equivalence of Russian terms has been carefully considered. The multilingual *Geobotanichesky Slovar'* (*Geobotanical Dictionary*) by O. S. Grebenshchikov (Nauka, Moscow, 1965) has been of great help, as has the *Entsiklopedichesky Slovar' Geograficheskikh Terminov* (*Encyclopedical Dictionary of Geographical Terms*), ed. S. V. Kalesnik; Sovietskaya Entsiklopediya, Moscow, 1968). I am also indebted to my husband, Dr Á. Löve, and many Russian and American friends and colleagues for assistance in interpreting certain terms.

There are some terms which have no corresponding English expression. One such word, very much used in Russian ecological literature, is *plakor*. It is derived from a Greek word for 'flat, level', but is used in Russian botany to describe a locality or a vegetation relating to a habitat with fine soil, typical of the zone discussed, on level ground, well drained, neither too wet nor too dry, with a moderate snow cover, melting off neither too early nor too late. I have reduced this formula to the short expression 'zonal, mesic habitat, vegetation', etc., and I hope that it adequately covers the Russian term.

The use of the word 'tundra' in the plural may at first seem strange, because we are used to seeing it in a singular form as a vague and wide term for arctic and alpine vegetation in general. But in a country with as much tundra as the Soviet Union, the distinction of the various types of tundra plant associations is much more precise. I have therefore followed the original when using the expression 'tundras'.

In contrast, it seems we have a much more varied nomenclature in English for the different types of wetlands. Where the Russian language uses one word, *bolota*, we have a whole row of distinct expressions: mires, swamps, bogs, mosses, fens, marshes, etc. In this text I have preferred to use the term 'mire' almost exclusively, because under arctic conditions there is actually nothing comparable to a true 'bog'. Also in northern Scandinavia the vegetation type called 'myr' is almost identical to the subarctic and arctic types described here. The Russian terms *kochka* (hummock), *bugor* (mound, hillock, palsa),

poligonal'noye (polygonal bog or mire) have been translated according to the Estonian Six-language dictionary *Saksa — Inglise — Rootsi — Soome — Eesti — Vene — Sooteaduslik Oskussonastik* (*German — English — Swedish — Finnish — Estonian — Russian* Dictionary of Scientific Peatbog Terminology) by V. V. Masing and the reference book *Permafrost Terminology* (Tech. Mem. 111, Assoc. Comm. on Geobot. Research, Nat. Res. Council, Canada, 1974), prepared by R. E. J. Brown & W. O. Kupsch.

In the Russian language there are two terms, *lug* and *lugovina*, the first of which means straight 'meadow', but the second is translated as 'short-grass meadow' in the dictionaries. Since this term, at least in the USA, is used for certain types of prairie (steppe) vegetation and since the tundra *lugovinas* described by the author are not only graminoid, but some of them are often herbaceous with predominating forbs, I use the term 'meadow-like communities' here.

Finally, I want to express my gratitude to the editors at the Cambridge University Press for valuable advice and assistance during my work.

January, 1979
Doris Löve

PREFACE

In his monograph *Introduction to an Investigation of the Vegetation of Yakutia*, V. L. Komarov (1926) published material which became of fundamental importance for the study of the geobotanical zonation of the arctic area of the USSR from the Khatanga River to the Chaun Inlet. Of great importance is the map which he drew at a scale of 1:4 200 000 of the northern forest limit and which up to recently was the most sharply defined boundary between the tundras and the forested regions in this wide territory.

At the time when Komarov wrote his work on the vegetation of Yakutia, the division of the polar regions into geobotanical areas was just beginning. The first attempts, carried out during the nineteenth and at the beginning of the twentieth centuries, concerned the East European North of the USSR (Trautvetter, 1851; Schrenk, 1854; Pohle, 1910). At the beginning of the twentieth century, there also appeared outlines for a zonal geobotanical division of the West Siberian North (Zhitkov, 1913; Gorodkov, 1916) as well as the works by Passarge (1921), who, having observed the zonation of the landscapes in the polar lands of both the northern and the southern hemispheres, distinguished 'the cold steppes' (the tundras) and 'the cold deserts', the latter called 'polar deserts' by B. N. Gorodkov.

During the fifty years which have elapsed since the appearance of Komarov's book, the study of the vegetation cover in the Arctic and the Antarctic has made much progress. A very large amount of information was gathered during the thirties in the USSR, when investigations were carried out over a wide area of the tundra territories in connection with the needs of reindeer husbandry and the utilization of water, soil and wildlife resources. The accumulation of information has

continued through the end of the forties into recent times, when in the USSR and abroad everything has become more adapted to aviation and mechanical means of communication. During the last few years, photographs taken by the aid of satellites (Vinogradov, 1970; Andersson, 1975) have also been utilized. The development of theories on division into geobotanical areas has, during this time, met with great success (Shennikov, 1940; Lavrenko, 1947, 1968; Sochava, 1948*a*, 1952, 1966, 1967, 1972; Schmithüsen, 1968; Karamysheva & Rachkovskaya, 1973; Il′ina, 1974; Karamysheva *et al*., 1975; Lavrenko & Isachenko, 1976; etc.). Outlines for a zonation of the Arctic have been drawn up within the USSR (Gorodkov, 1935*b*; Leskov, 1947; Sochava, 1948*a*; etc.), in the circumpolar area (Polunin, 1951; Yurtsev, 1966, 1974*a*; Aleksandrova, 1969*b*, 1971*b*), and for the high latitudes (Korotkevich, 1967, 1972) as well as for the Antarctic (Greene, 1964*a*; Holdgate, 1964; Korotkevich, 1966, 1972; Kats, 1971; etc.). Gribova (1975) has drawn a circumpolar map of the vegetation in the Arctic.

There is now an interest in using the accumulated material to formulate a division of the polar lands into geobotanical areas and in examining, from a uniform point of view, the vegetation cover of the circumpolar territories of the Arctic northward from the forest limit to the farthest points of the land and of the Antarctic southward from the line of the antarctic convergence.

ACKNOWLEDGEMENTS

During the preparation of the manuscript for printing, I have enjoyed a number of valuable discussions and received much good advice from V. N. Andreyev, M. S. Boch, S. A. Gribova, A. G. Isachenko, A. E. Katenin, N. V. Matveyeva, T. G. Polozova, O. V. Rebristaya, I. N. Safronova and B. A. Yurtsev, and I want to express my deepest gratitude to them.