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AUTHOR'S NOTE

In this article the phonetic transcription developed by the Tibetan and Himalayan Library (THL) is used in order to make Tibetan terms accessible to non-specialists. On the THL transcription system, see Germano & Tournadre 2003.

Introduction

- 1 The use of animals for medicinal purposes, in parts or in the form of animal-derived products, is a feature of most medical systems in Asia and throughout the world¹. The historical record shows that the use of animal-based remedies is an extremely old practice, which can be found in the pharmacological texts of not only the Egyptian medical tradition, but also those of the Mesopotamian, Roman, and Greek medical traditions². The phenomenon of zootherapy – that is, using therapeutics based on medicines obtained from animals, or ultimately deriving from them – occurs all over the world, and reaches back into antiquity³. Domestic and wild animals, as well as their by-products, were important ingredients in drugs used for curative, protective, and preventive medicine. In both the past and the present, the use of animal-based medicines has had far-reaching implications in terms of ecology and economy⁴. Their availability and accessibility have long been a concern for doctors using animals and their by-products, and the potential of overexploitation is a real threat, which has been alleviated by the mass rearing of animals, including medicinal insects⁵. According to Lokeshwari and Shantibala, one can broadly classify the current exploitation and utilization of insects into four different categories⁶. First, insects are used as industrial

resources, such as lac and natural dye. Second, they are consumed as food and taken as medicine. Third, they appear in forensic entomology, and finally they possess a high ecological importance regarding biomass recycling and so on. The medicinal use of insects, i.e. entomotherapy, has drawn the attention and the resources of pharmacological researchers in the search for new drugs⁷. Many such researchers hope to find bioactive compounds that may lead to new therapeutics. Shrivastava and Prakash, for example, see the potential for the discovery of new drugs, especially with regard to cytotoxins and anticancer compounds, neurotoxins, antibiotics, and antivirals⁸. A famous example is cantharidin and its derivatives, which can be found in several species of blister beetles of the genera *Mylabris* and *Lytta* (Meloidae)⁹. *Mylabris cichorii* is, for instance, found in parts of India and China, and it seems that it was also used in Tibetan medicine (see below).

- 2 The Chinese and Indian medical traditions, both of which have had a lasting influence on the Tibetan medical tradition, are known to draw on animals for curing diseases, including a wide range of insects. It has been said that about 13% of the medicinal substances used in Chinese medicine derive from animals¹⁰. Some authors speak of more than 1500 animal species that have been recorded to be of some medicinal use in the Chinese tradition¹¹. According to Feng *et al.*, in Chinese medicine there are approximately 300 medicinal insect species distributed across 70 genera, 63 families, and 14 orders, and an estimated 1700 traditional Chinese medicine prescriptions include medicinal insects or insect-derived crude drugs¹². They point out that in the earliest Chinese pharmacopeia, more than twenty kinds of insect-derived drugs from eight species of insects are recorded. The famous *Compendium of Materia Medica* (*Bencao gangmu*) composed by Li Shizhen (1518-1593) contains seventy-three types of insect-based drugs, which derive from sixty species of insects. It is estimated that more than one hundred kinds of medicinal insects have been recorded for use in ancient times¹³.
- 3 It has also been estimated that in Ayurveda about 15-20% of its *materia medica* derive from animal products. In the *Caraka-saṃhitā*, for example, 230 types of animals and 380 types of animal substances are mentioned. Similarly, approximately 225 types of animals are mentioned in the *Suśruta-saṃhitā*. Most of these references discuss animals as food and medicine¹⁴. Beside the classical texts of Ayurveda, medicinal animals are an integral part of folk medicine. A recent review summarizing and analysing the data in fifteen research works on zootherapeutic practices in different parts of India concludes that about 109 animals are used in 270 medical applications¹⁵. With regard to insects specifically, studies have shown that they are used in various ways among Indian ethnic communities. Some edible insects are consumed, and others are gathered for therapeutic uses¹⁶. Building upon this background, the present article seeks to clarify the therapeutic importance of medicinal insects and introduce some of the insects that were used in the Tibetan medical tradition by analysing traditional medical sources.

The classification of animals in the Tibetan medical tradition

- 4 The earliest preserved sources of the Tibetan medical tradition are the medical texts found at Dunhuang and Turfan. They can be tentatively dated to around the 9th or 10th century. They are available in the form of modern editions and on online databases¹⁷. They give important insights into the application of plant, mineral, animal,

and human substances in the early instructional texts of Tibetan medicine. Previous research has shown that some of these substances originate in far-off regions and were made accessible to the Tibetan doctors via long-distance trade, which is reflected in the specific Tibetan names for certain remedies and *materia medica* that clearly show signs of their foreign origins, such as the remedy theriac, and the medicinal substances camphor and saffron¹⁸. Tibetan areas also contributed to this pan-Asian trade network, by supplying substances like musk, for example¹⁹. Even in these early sources, animal products are mentioned as components of drugs, but these were not the only uses of animal substances. Felt, for example, was also used to treat wounds, and milk was recommended to accompany the ingestion of certain drugs. The size of the droppings of certain animals also served as a standard of comparison when creating medicinal pills²⁰.

- 5 Although animal substances were an integral part of Tibetan medicine, there are only a few systematic and detailed descriptions of them. Even in early sources, details regarding the appearance of the animal and where it is found are very rarely provided, which is in contrast to plants that are often described in detail. The first systematic list of animal *materia medica* in the Tibetan medical tradition was prepared by Yutok Yönten Gönpo (g.Yu thog Yon tan mgon po, fl. 12th century) in the 20th chapter of the *Explanatory Tantra* of his fundamental work, the *Four Tantras*²¹. There he distinguishes different types of *materia medica* based on the substance from which they are composed, such as precious stones and so on. The last category of this schema is animal-based medicine, and it is the category in which formulae for most, but not all, animal products have been compiled. Some animal products can also be found in the category called “medicinal sap” (*tsimen, rtsi sman*), which can derive from roots, trees, and animals. The most important “animal sap” or “animal secretion” are (elephant’s) bezoar, musk, and bear bile.
- 6 The category of medicinal animals in the *Four Tantras* is further classified into thirteen sub-categories. These include (1) horns, (2) bones, (3) flesh, (4) blood, (5) bile, (6) fat, (7) brain, (8) skin, (9) nails, claws, beaks, and hooves, (10) small hairs and feathers, (11) urine, (12) faeces, and (13) the bodies of insects. Reviewing each item in the list, however, it becomes clear that other categories – such as the liver, stomach, lungs, tongues, and testicles of the animals – were also used to classify animal products used in medicines. These lists also include substances of human origin such as human bones, flesh, fat, brain, urine and faeces. Taken as a whole, the category of medicinal animals comprises ninety-six kinds of animal substances. Based on the respective categories, there are nine kinds of horns, fifteen kinds of bones (including cowry and snail shell), thirteen kinds of flesh, three types of liver, one kind of stomach, four kinds of tongues, two kinds of testicles, eight kinds of blood, four kinds of fat, five kinds of brain, four kinds of skin, one kind of beak or scale, three kinds of hooves, four kinds of feathers, two kinds of thin hair, two kinds of urine, ten kinds of faeces, and seven kinds of whole bodies of insects and others. Note that bile is listed in the overview but not further exemplified in the list, because it is, as already mentioned above, dealt with in the category of “medicinal sap”. In this regard, Yönten Gönpo mentions the bile of a bear only but as it will be discussed below the bile of various animals could be used for medicinal purposes as indicated by Tendzin Püntso. However, it would be mistaken that to think that these lists represent all animal substances mentioned in the *Four Tantras*. In the *Instructional Tantra*, for example, one finds further substances not

included in the list found in the *Explanatory Tantra*. Sangyé Gyamtso (Sangs rgyas rgya mtsho, 1653-1705), who wrote a commentary entitled the *Blue Beryl on the Four Tantras*, adds the substances described in the *Instructional Tantra* in his discussion about *materia medica*, and also includes them among the illustrations in his series of medical *thangkas*²². For several centuries, the commentarial literature on the *Four Tantras* remained the main written source for systematic information on animals used in Tibetan medicine.

- 7 Scholarship on *materia medica* within the Tibetan medical tradition completely changed with the seminal work known as the *Lumps of Crystal. A Rosary of Crystal* (*Shel gong shel phreng*) written by Tendzin Püntso (bsTan 'dzin phun tshogs, b. 1672). His work covers all sorts of *materia medica*, and consists of two separate works: *Lumps of Crystal*, which is a concise list of *materia medica* and their healing potentials, and *A Rosary of Crystal*, which is its commentary. The ninth section of this work describes medicinal substances that derive from animals, and it is subdivided into twenty-nine divisions, occasionally with subitems. The divisions include (1) horns and so on, (2) eyes, (3) tongues, (4) teeth, (5) throats and necks, (6) hearts, (7) lungs, (8) livers, (9) bile, (10) spleens, (11) kidneys, (12) stomachs, (13) small intestines, (14) genitals, (15) bones and so on, (16) bone marrow, (17) brain, (18) fat, (19) blood, (20) flesh, (21) skin, hide, and so on, (22) hair and so on, (23) feathers, (24) nails, claws, beaks, and hooves, (25) bezoar, (26) faeces, (27) urine and semen, (28) milk including milk, curd, and butter, and (29) whole bodies of insects, eggs of birds, and so on. Similarly to the *Four Tantras*, “animal secretions”, such as musk and bear bile, are included in the section on “medicinal sap”. In general, Tendzin Püntso used the *Four Tantras* as the main base for his treatise, but expanded, supplemented, and elaborated upon it. The total number of body parts deriving from different species varies, for example, and is not the same as the *Four Tantras*. He lists the eyes used for medicinal purposes as coming from five species, and he describes the tongues of seven animals that can be of help in curing diseases. Concerning the brain, he registers sixteen types of brains from different animals, and also from humans. The biggest demand was apparently for the bile of nineteen animals, including humans, as well as fifty-three types of bones coming from animals such as sheep, goats, fish, snail shells, tortoises, fossils, and humans. According to Tendzin Püntso, many animals possessed several parts that could potentially be of use in Tibetan medicine. A doctor might use the neck, stomach, brain, meat, feathers, and excrement of the bearded vulture, known as *gowo* (*go bo*) in Tibetan²³. Similarly, the cinereous vulture called *jagö* (*bya rgod*) had several body parts that were of interest, such as the eyes, neck, heart, bile, stomach, bones, and flesh, as well as its excrement and urine²⁴. In contrast to his long descriptions of plants, however, Tendzin Püntso does not discuss the animals in any significant degree of detail. He usually just names them and neglects any further information regarding where they can be found, how they live, and so on.
- 8 Scholarship on animal-based *materia medica* further progressed in the 19th century when a monk from Inner Mongolia composed a treatise on *materia medica* in the Tibetan language. In his *Beautifully Wondrous Eye Ornament* (*mDzes mtshar mig rgyan*), Jampel Dorjé ('Jam dpal rdo rje), alias Yeshé Döndrup Tenpé Gyemtsen (Ye shes don grub bstan pa'i rgyal mtshan, 1792-1855), includes illustrations that mostly derive from the *Bencao gangmu*, originally written by Li Shizhen and later printed in numerous editions²⁵. In addition to Tibetan names for *materia medica*, he also includes Manchu, Mongolian, and Chinese names, and the latter with a rough pronunciation in Tibetan. It was never of great significance for the Tibetan medical tradition, but it became important for

Mongolian medicine. Partially deviating from the precedents set by the *Four Tantras*, Jampel Dorjé chose some new criteria for the classification of *materia medica*, which becomes most obvious with regard to animals. He divides the animal-based *materia medica* into eight categories, which consist of:

1. Animals scratching with their feet
2. Animals pecking with their beaks
3. Herbivorous animals
4. Carnivorous animals
5. Animals eating with force
6. Animals domesticated by humans
7. Animals living in dens and burrows
8. Animals living in water and damp places²⁶.

- 9 These classifications are quite unusual and are not found in other Tibetan works on *materia medica*. Jampel Dorjé certainly took the sixteenth chapter of the *Explanatory Tantra* which deals with the normal diet, including meat and fish, as a basis for his categories, but Yutok Yönten Gönpö distinguishes between several kinds of animal flesh, illustrating them by giving examples²⁷. It should be noted that Yutok Yönten Gönpö enumerates a total of nine categories, but they are collectively referred to as only eight categories (*sde brgyad*²⁸). It is possible that the third and fourth categories were once considered to be a single category, or a category was later inserted into the *Four Tantras*²⁹. Commentators on the *Four Tantras*, such as Kyempa Tsewang (sKyem pa Tshe dbang, b. 1514) and Sangyé Gyamtso did not see this difference between eight and nine categories as important. The commentary of Pema Karpo (Padma dkar po, 1527-1592), which only identifies the main and sub-points of *Four Tantras*, counts only eight categories, lacking the category of large animals in the open mountains³⁰. The same applies to the commentary written by Lozang Chödrak (Blo bzang chos grags, 1638-1710³¹).
- 10 The schema for the categorization of animals in the *Four Tantras* derives from the Ayurvedic treatise, the *Aṣṭāṅgahṛdaya-saṃhitā* of Vāgbhaṭa. In the latter book, accessible to Tibetan scholars through translation, the normal diet is discussed in the sixth chapter of the first book, which describes a normal diet³². Regarding flesh and meat, Vāgbhaṭa classifies the animals in eight classes, based on zoological categories known in ancient India³³.
- 11 In the *Beautifully Wondrous Eye Ornament*, Jampel Dorjé provides a brief description of each animal and sometimes their healing potential, with the latter information deriving from either the *Four Tantras*, the *Blue Beryl*, or *A Rosary of Crystal*. In a few cases, his descriptions might also include mythical animals, such as the so-called Kalanta bird. He places the Kalanta bird in the first group of animals, labelled as the “category of animals digging with their claws”, which can be traced back to the Ayurvedic category, *viṣkīra* (*trönko*, *khron rko*). One can interpret the Sanskrit term literally as birds that “scatter their food with their feet”, or as birds that “scratch the soil in search of food³⁴”. Tibetan translators of the Sanskrit term have interpreted *viṣkīra* to mean birds that “dig/scratch (the soil) with their claws (in search of food)”. Jampel Dorjé chose to group the Kalanta bird under this category, most of which are known species. Therein he describes it as follows (Fig. 5):

Kalantaka: The baby bird (indicates) that an auspicious time has begun. The body (of the adult bird) is large and its tail feathers, which are of five colours, are very beautiful. His singing entangles those who have ears, and when he hovers (in the sky), all the big and small birds follow him. In the *Lumps of Crystal* it is stated: “The

head of the male pigeon Kalantaka is a powerful drug for the restoration of virility, and it is the best among the remedies for healing wounds". The baby bird, which is pleasant to hear, resembles a pigeon and is greenish. One must not confuse it with the Kalapingga (bird³⁵).

- 12 The illustration, as well as the names listed in Mongolian, Manchurian, and Chinese make it clear that Jampel Dorjé is describing a phoenix. This is surprising because the phoenix does not generally play a role in Tibetan mythology or in Tibetan medicine. The reference to the *Lumps of Crystal* is also misleading, for Tendzin Püntso is describing a real bird and not the mythological phoenix. The Kalantaka bird sometimes occurs in Buddhist literature, but it remains unclear what kind of birds it is³⁶. Thus, Jampel Dorjé is combining several different descriptions of birds, both real and mythological, by introducing the Kalanta bird into the Tibetan medical tradition. At the same time, he warns that one should not confuse the Kalanta bird with another mythological being, the *kalapingga* (in Tibetan) or *kalaviṅka* (in Sanskrit), which is a mythological half-human creature with the body of a bird and a long flowing tail. It is famous for its sweet voice³⁷.

The medicinal insects in Tibetan medicine

- 13 It should be noted at the outset that insects were used only to a very limited extent in Tibetan medicine. The only important exception is the lac insect (*gyakyek*, *rgya skyegs*), which can be found in numerous Tibetan drugs. The honey of bees has often been added to drugs (*drangtsi*, *sbrang rtsi*) as well³⁸. In the following paragraphs, eleven insects that are mentioned in Tibetan medical treatises will be discussed, demonstrating how Tibetan doctors described them, potential identifications provided by modern authors, and which healing potentials they are said to possess³⁹. The medicinal insects considered include flies, ants, two insects whose existence is doubtful, cicadas, butterflies, grasshoppers, and four kinds of beetles⁴⁰. Their Tibetan names and their Western identifications are listed in the appendix, along with further references.

Shadrang (sha sbrang)

- 14 The term *shadrang* – literally rendered as “flesh bee” or “flesh fly” – occurs in neither the *Four Tantras* nor its commentaries. It does occur in the treatise *Ten Million Instructions: Relics* (*Bye ba ring bsrel*) written by Nyamnyi Dorjé (mNyam nyid rdo rje, 1439-1475), however. There it is said that one should use the body of the “flesh fly” with big eyes as an ingredient in a remedy for “restoring virility” (*rotsa*, *ro tsa*⁴¹). In the 18th century, Nyamnyi Dorjé’s drug was included in three important lists of Tibetan medicaments, one compiled by Tendzin Püntso, and two by Karma Ngedön Tendzin Trinlé Rapgyé (Karma nges don bstan ’dzin ’phrin las rab rgyas, b. 1770⁴²). Orgyen Tekchok (O rgyan Theg mchog, b. 19th century) also adds it to his drug section on “restoring virility⁴³”. In the prestigious compilation of Tibetan drugs prepared by the Mentsikhang in Lhasa in 2005, this medicament is listed as the drug named Soma Senggé-25 (*sro ma seng ge nyer lnga*⁴⁴). The “flesh fly” is not discussed by any other scholars, with the exception of the contemporary Chinese scholar Luo Dashang, who states that it might be used to boost the male sex drive⁴⁵.

Raksha mikmé (raksha mig med)

- 15 If one consults modern publications on Tibetan *materia medica* written by Tibetan authors, one will come across statements on the use of ants in Tibetan medicine. They uniformly identify such ants as *Formica fusca*, a black-coloured ant, but it remains unclear how they came to this precise identification⁴⁶. With the exception of the treatise written by Jampel Dorjé, there are only a few sketchy traditional descriptions of ants in Tibetan medical literature. Jampel Dorjé states that their bodies are segmented into heads, upper, and lower bodies, and that they are black, have six legs, and emerge from nests. Because ant nests in India are big like fortresses, they are depicted as emerging from just such a nest in the *Beautifully Wondrous Eye Ornament* (Fig. 6⁴⁷). In the Tibetan language, ants are also called *raksha mikmé*, which literally means “eyeless demons” (*raksha mig med*). In *A Rosary of Crystal* by Tendzin Püntsok, it is said that ants can open “channels” and purify *muchu* (*dmu chu*⁴⁸), which is characterised by accumulation of fluids in the body⁴⁹. Tendzin Püntsok probably drew this information from the *Blue Beryl* of Sangyé Gyamtso, where this statement is also made⁵⁰. In this regard, Sangyé Gyamtso also mentions the use of soil from an anthill for suppressing the “swelling of the flesh” (*shatrang, sha skrang*⁵¹). Although he provides no details for how this is done, one can assume that he was influenced by the Ayurvedic tradition, in which such a use is recommended and explained. In the twenty-first chapter of the *Aṣṭāṅgahrdaya-saṃhitā*, for example, in the section on therapeutics for “wind” (*vāta*) diseases, Vāgbhaṭa discusses a medicinal paste that includes the soil of an anthill together with mustard and honey⁵². The use of ants themselves is not mentioned in Vāgbhaṭa’s work, however. This particular use of soil of an anthill is also depicted in the famous Tibetan medical paintings that serve as illustrations for the *Blue Beryl* (Fig. 1⁵³).
- 16 Moreover, it seems that in the past some doctors thought that ants could be used for the diagnosis of poisoning. In the eighty-seventh chapter of the *Instructional Tantra* dealing with “compounded poison” (*jarduk, sbyar dug*), Yutok Yönten Gönpo states that one should boil *raksha* in water and give the patient a handful to drink in the evening after sunset. If the patient’s mind is disturbed, the text states, and his or her body becomes heavy and he or she begins to shiver, he or she has been poisoned⁵⁴. Later commentators such as Kyempa Tsewang and Sangyé Gyamtso have understood the term *raksha* as corrupted form of *ru raksha*, the Tibetan term for the Sanskrit *rudrākṣa*, the seeds of specific large evergreen trees used for prayer beads⁵⁵. Others such as Lozang Chödrak (Blo bzang chos grags, 1638-1710), Könchok Chödrak (dKon mchog chos grags, 1646-1718), Karma Ngedön Tendzin Trinlé Rapgyé (b. 18th century), and Trashibum (bKra shis ’bum, b. 1726) have interpreted *raksha* as an “ant” (*drokma, grog ma*) or “eyeless demon” (*rakshamikmé, raksha mig med*⁵⁶). Lungrik Tendar (Lung rigs bstan dar, 1842?-1915) also notes in his explanation of difficult terms in the *Supplement to the Instructional Tantra*, a work written by Sangyé Gyamtso supplementing the *Instructional Tantra* of Yutok Yönten Gönpo, that there are two opinions: one that maintains *raksha* refers to *ruruksha*, and one that interprets *raksha* as a reference to ants⁵⁷. The same statement can be found in Lungrik Tendar’s work explaining the difficult expressions of the *Four Tantras*⁵⁸.
- 17 Beside these brief descriptions, ants are rarely mentioned in Tibetan medical sources. In the early text *King of the Moon* (*Zla ba’i rgyal po*), ants are listed as an ingredient for a

powder that is used to treat “swellings in the throat and the uvula” (*gaklhok, gag lhog*⁵⁹). It can also be found in a brief treatment for “smallpox” (*drum, 'brum*) written by Pöntsang Yeshé (dPon tshang Ye shes, fl. 17th century⁶⁰). Moreover, ants were part of pills administered to drain the patient's body of fluids, as explained by Jampel Chökyi Tendzin Trinlé ('Jam dpal chos kyi bstan 'dzin 'phrin las, 1789-1838) in his work *A Jewel Mine of Instructions* (*Man ngag rin chen 'byung gnas*⁶¹). Given the number of potential therapies and extant medical sources, this number of descriptions is not exceedingly high. Perhaps a full survey of all available Tibetan medical texts will bring to light more results. Such an endeavour would not be a small contribution, particularly in light of the notion that ants can be used to open “channels”, as maintained by Tendzin Püntso in his *A Rosary of Crystal*, for which textual evidence in clinical sources is still required.

Zhobur (zho sbur)

- 18 The difficulties involved in the identification of Tibetan *materia medica* is well illustrated by the example of the *zhobur* insect. Its name can be literally understood as the “yogurt beetle”, and Sangyé Gyamtso states that it is a small beetle that is beneficial for “yellowish fluid” diseases⁶². “Yellowish fluid” (*chuser, chu ser*) is a sticky fluid that is said to be located between flesh and skin and in the joints. It has a mixed reddish-yellow colour; the red colour is a waste product of blood, and the pale-yellow colour is a refined product of “bile”. If it increases or decreases it causes diseases, which are the so-called diseases of “yellow fluid”⁶³. Consulting the fifty-ninth chapter of the *Instructional Tantra*, one only finds a line where a beetle is recommended for the treatment of “yellow fluid” disease, but not a “yogurt beetle”⁶⁴. In Sangyé Gyamtso's commentary, the beetle is described as a *zhöbur* (*zhod sbur*), probably a mistake for *zhobur* (*zho sbur*; see Fig. 2⁶⁵). Later authors on Tibetan medicine have tried to elaborate upon this identification, with Lungrik Tendar stating that *zhobur* is a small and very quick beetle⁶⁶. Jampel Dorjé suggests that *zhobur* are worms that emerge when the summer curds become stale (Fig. 7⁶⁷). This is also Sangyé Gyamtso's interpretation of the term *zhobur*. Other commentators, such as Kyempa Tsewang and Trashibum, think that the term “beetle” listed in the fifty-ninth chapter of the *Instructional Tantra* stands for the *sebur* beetle⁶⁸. Karma Ngedön Tendzin Trinlé Rapgyé thinks that it refers to a “black/dark golden beetle”⁶⁹. Given this complicated and obscure situation, it is hardly surprising that none of the modern publications on Tibetan *materia medica* include the so-called “yogurt beetle”.

Trumembu (spru ma'i 'bu)

- 19 The term *trumembu* means the “worm of the *truma* plant”, and the *truma* plant is often distinguished into a white or a bright, and a black or dark type. Some sources also refer to a yellow type. In Western botany, the *truma* plant potentially corresponds to a wide range of plants, including the genera *Heracleum*, *Notopterygium*, *Valeriana*, *Angelica*, *Thalictrum*, *Aralia*, and *Actaea*⁷⁰. Namgyel Drakpa Zangpo (Rnam rgyal grags pa bzang po, 1395-1475) describes the worms as being found on the white type⁷¹. Kyempa Tsewang does not say where they can be found, but only writes that the worms are multi-coloured⁷². Sönam Yeshé Gyentsen (bSod nams ye shes rgyal mtshan, b. 15th century) combines both statements by saying that they live on the white *truma* plant and are multi-coloured⁷³. Lozang Chödrak elaborates upon these descriptions by writing that

they live among the roots of the white *truma* plant. He states that they are multicoloured and about the size of a thumb⁷⁴. Trashibum adds that they occur during autumn⁷⁵. Jampel Dorjé writes that the worms live on the leaves of the white *truma* plant (Fig. 7⁷⁶). Given the sparse nature of these descriptions, it is hardly surprising that scholars have mostly abstained from identifying the *trumembu*, sometimes surmising that it is the chrysalis of caterpillars, but not specifying any further⁷⁷. The Translation Department of the Men-Tsee-Khang in Dharamsala has also abstained from translating the term in their English edition of the *Four Tantras*. They probably were unable to identify the *trumembu* with any degree of confidence⁷⁸.

- 20 According to the *Four Tantras*, the *trumembu* stops the loss of blood of the “channels”⁷⁹. In other words, it stops the bleeding of a cut or injured “channel”. The fact that Sangyé Gyamtso duly notes this healing potential, but does not say anything about the worm (Fig. 4) further indicates the ambiguous nature of the *trumembu*⁸⁰. In fact, the term “worm of the *truma* plant” does not figure in his entire commentary, except for the occurrence just mentioned. Instead, he consistently speaks of the “seeds of *truma* plant” (*trumemdru*, *spru ma'i 'bru*). When discussing the *truma* plant, he says that these seeds are also known under name *shuti* (*shu ti*⁸¹). The conflation of these two words indicates a fundamental problem in their identification: how should one confidently differentiate the “worm of the *truma* plant” (*trumembu*) from the “seed of the *truma* plant” (*trumemdru*)?
- 21 In the animal section on *materia medica* in the *Four Tantras*, one finds the “worm of the *truma* plant” as part of animal products used for healing. The Bönpo version of the *Four Tantras*, the *Four Hundred Thousands* (*'Bum bzhi*), renders even this simple identification uncertain, however, because there the “seed of the *truma* plant” is listed⁸². Although the *Four Hundred Thousands* includes the “seed” and not the “worm of the *truma* plant”, the “seed” is still listed in the section on animal products. It seems that the conflation of these two terms frustrated some doctors, for Tendzin Püntsok clearly writes that it is a mistake to amend “worm of the *truma* plant” to “seed of the *truma* plant”⁸³. Consequently, he does not even mention seeds of the *truma* plant or bush in his *Rosary of Crystal* at all, but one finds “worms of the *truma* plant” as a *materia medica* of animal origin⁸⁴. Importantly, the *truma* plant was traditionally prescribed to stop bleeding, which is the same healing potential that these obscure worms are said to have. One might add that the dried roots of the *truma* plant can look like worms, which causes one to speculate that this could possibly be the origin of these “worms of the *truma* plant”.

Jelep sertra (bye leb ser khra)

- 22 Tibetan doctors also knew of medicinal usages for butterflies, which are called “yellow mottled flat flying (insect)” (*jelep sertra, bye leb ser khra*), “flat flying (insect)” (*chemalep, phye ma leb*), and “tiger (striped) flying (insect)” (*jetak, bye stag*) in medical works. Butterflies are not listed in the *Explanatory Tantra* and therefore they are also rarely discussed in the corresponding commentaries. Again, Jampel Dorjé is the exception, for he describes the *chemalep* as being the yellow mottled butterfly, with a slender and small body, four wings, and colours that are so clear, it is as if they have been painted on (Figs 2, 9⁸⁵). In the literature on Tibetan *materia medica*, the *chemalep* is also identified as the common yellow swallowtail, the eastern pale clouded yellow, or the high-altitude butterfly, *Parnassius imperator*⁸⁶.

- 23 Even though the *chemalep* is not mentioned in the *Explanatory Tantra*, its medicinal use is recommended twice in the *Instructional Tantra*. It occurs in the chapter on diseases of the teeth, as well as the chapter discussing minor diseases, such as “twisted calf” disease (*nyalok*, *nywa log*). In the former chapter, the term “tiger (striped) flying (insect)” (*jetak*, *bye stag*) is used, and in the latter the term “tiger striped one” (*taktrawo*, *stag khra bo*). The commentators of the *Instructional Tantra* usually write that these terms refer to the “yellow mottled butterfly” (*jelep sertra*) in both cases⁸⁷. Based on this actual usage, Sangyé Gyamtso gives the healing potential of the flesh of the butterfly as curing the “tooth diseases caused by small animals” (*sosin*, *so srin*) and “twisted calf” disease⁸⁸. This information is repeated by Tendzin Püntso in his *Lumps of Crystal*⁸⁹. In general, *sosin* disease is characterised by the swelling of dental roots down to the “channels” of the teeth, turning them into pus. It is so painful one cannot touch it, regardless whether the “disease caused by small animals” (*sinné*, *srin nad*) is of a hot or cold nature⁹⁰. For a patient with “small animals of teeth”, pain rises and abides, and the teeth ache sharply. The symptoms of “twisted calf” disease are a fine pulse and a urine having a colour like dark butter. One has headaches, painful joints, cramps in the calves, sore “channels”, an upset stomach, diarrhoea, one loses one’s voice, the complexion of one’s face is spoiled, and one speaks nonsense like a madman⁹¹.

Chagapa (cha ga pa)

- 24 It seems that grasshoppers were also used for specific medical applications. Not many detailed descriptions of the grasshopper’s appearance and habitat are found in medical works, which is perhaps due to an opinion expressed by Kyempa Tsewang that, although there exist many types of grasshoppers that can be distinguished by size and colour, they all possess the same healing potential⁹². Seen from this perspective, one could use any grasshopper for medicinal compounds, whatever species it may be. Most treatises just name its synonyms, such as the “one of the (cracking sound) *tsaktsak*” (*tsaktsakpa*, *tshag tshag pa*), the “lion cub that protects the sky”/“lion cub that jumps in the sky” (*sengtruk namchong*, *seng phrug gnam ’phyong / mchong*), and others⁹³. Sangyé Gyamtso also provides some alternative names, as well as a brief description stating that they appear in the grassland during autumn and can fly⁹⁴. Jampel Dorjé writes that *chagapa* are about a thumb’s length, are pale brownish with black spots, and have red wings. He also states that if they soar, they make a sound, the last pair of its six legs are long, and their saliva is known as “brownish ambrosia”. He concludes by stating that in China they exist in abundance and consume the harvest (Figs 3, 10⁹⁵). Modern literature on Tibetan *materia medica* state that *chagapa* refers to a grasshopper, but they differ in its exact identification. Some say that it is the *Oxya chinensis* Thunberg, while others think it is the *Patanga japonica* Bolivar⁹⁶.
- 25 *Chagapa* is not listed in the *Explanatory Tantra*, but it does appear in both the *Instructional* and *Subsequent Tantras*. In both cases, *chagapa* is used for cleansing the “channels”, and in the *Instructional Tantra* it is mentioned in the eighty-seventh chapter on eliminating “compounded poison” (*jarduk*, *sbyar dug*). There it is part of a special three-fold treatment consisting of “gathering”, “killing”, and “cleansing” the poison⁹⁷. In the *Subsequent Tantra*, it is part of a very important cleansing application regarding the “channels” that forms the entire nineteenth chapter⁹⁸. The most important *materia medica* used in combination with the grasshopper is the *jangpa* beetle, which will be discussed below. Here let us merely note that the *jangpa* beetle is very poisonous, and it

had to be combined with the *chubur* beetle (on this beetle also see below) to counteract its poisonous effect. If the latter beetle was not available, however, three heads of grasshoppers were recommended instead⁹⁹.

- 26 Finally, it has also been stated that the “saliva” of grasshoppers, called “brownish ambrosia”, (*dütsi mukpo, bdud rtsi smug po*) could be used for a head injury called “dripping brain”. Nyamnyi Dorjé recommends the use of the saliva of grasshoppers for such a medicine purpose in his *Ten Million Instructions. Relics*, for example¹⁰⁰. Throughout the instructions of the Tibetan medical tradition, the primary use of grasshoppers, however, was to alleviate or to neutralize the poison of the *jangpa* beetle. This was achieved not only by adding grasshopper heads to a medicinal preparation as mentioned above, but also by using them as an independent ingredient for the antidote in case a patient has been poisoned by a *jangpa* beetle¹⁰¹.

Zindira (zi ldi ra)

- 27 It seems that cicadas (*zindira, zi ldi ra*) were also used in Tibetan medicine¹⁰². None of the modern scholars writing on Tibetan *materia medica* discuss *zindira*, except those who were engaged in translating Tibetan medical sources that include this insect, such as the *Four Tantras* and the *Blue Beryl*. One reason why other authors neglect to engage this insect is probably because Yutok Yönten Gönpo does not include it in his list of *materia medica* in the twentieth chapter of the *Explanatory Tantra*. Even Tendzin Püntso did not include *zindira* in the *Lumps of Crystal*. The only medical treatise known so far where it is mentioned is the *Four Tantras* of Yönten Gönpo, where it appears in the seventy-second chapter of the *Instructional Tantra* on paediatric diseases. There it is recommended that a particular disease called “stiff navel” (*lte mkhrang*) be treated with a drug that consists of the ashes made of *zindi* (*zi ldi*) and a beetle (*bur, sbur*), as well as the singed hair of the father and mother of the child, all cleansed in the urine of the child¹⁰³. The various commentators of the *Four Tantras* have commented on both of these animal terms. Kyempa Tsewang wrote that *zindi* denotes a large beetle that is able to fly, and from which poisonous fluids emerge¹⁰⁴. Although the meaning of the latter is uncertain, perhaps it refers to species of beetle that lives in a wet habitat, or to a species living in a burrow that is coated in fluids.
- 28 This opinion of Kyempa Tsewang is repeated by Lozang Chödrak in his commentary on the *Instructional Tantra*, which was arranged as the third part of Zurkhar Lodrö Gyelpo’s *Oral Instructions of the Forefathers* (*Mes po’i zhal lung*¹⁰⁵). Sangyé Gyamtso devotes a separate entry for *zindira* in his supplementary list of *materia medica* for the twenty-first chapter of the *Explanatory Tantra* (Fig. 3), and according to him, it has only one designation and no synonyms. The big cicadas emerge at the time of the summer solstice, and only one summer in every four years. The small cicadas emerge at midnight, however, and they are beneficial for diseases caused by its (poisonous) fluids and the “stiff navel” disease of children, which is of the severe type (*nyen, gnyan*¹⁰⁶). He does not elaborate on the former type of disease, and while discussing the treatment of the pediatric disease, he does not add anything¹⁰⁷.
- 29 Later commentators were clearly influenced by the *Blue Beryl*, but also introduced some new information when writing about *zindira*. Karma Ngedön Tendzin Trinlé Rapgyé, who lived and worked in Eastern Tibet, writes that the *zindi* are big, dark, golden flying beetles that emerge during the summer solstice. If they move in water, poisonous fluids

emerge from them, and they are also called “rising up crawler” (*danggok, ldang gog*), “soaring crawler” (*dinggok, lding gog*) and “zi chirping (insect)” (*zi[n]dira, zi di [ldi] ra*¹⁰⁸). When discussing the *materia medica* in his work on the difficult terms in the *Four Tantras*, Lungrik Tendar usually quotes the *Blue Beryl* without any addition¹⁰⁹, but when discussing *zindira* in the chapter on pediatric diseases he writes that it is a big flying beetle with antennae that emerges in places with poisonous water¹¹⁰. Jampel Dorjé cites both the commentary on the *Instructional Tantra* written by Lozang Chödrak and the commentary by Sangyé Gyamtso, followed by the observation that the big type produces a chirping sound when flying. They live on trees, are yellow-brownish, and are the size of a *sebur* beetle. The small type has gold on its back and is the size of a finger nail of the little finger, and they fly in masses to the desert (Fig. 8¹¹¹). Trashibum alone gives a different statement, saying that *zindi* is “dog incense” or “the one of the dog incense¹¹²”. It remains unclear what he means by this phrase, perhaps referring to the plants that the *zindi* eat.

Sebur (bse sbur)

- 30 The *sebur* (*bse sbur*) is another insect that is considered to possess healing potentials. Its name can be understood literally as “stink beetle”, and it is described in some Tibetan sources as a black beetle, a stink beetle, and a black beetle with a stinking smell¹¹³. Two authors add that its back is golden¹¹⁴. Lozang Chödrak provides a more detailed description in his work *Golden Annotations* written in 1695, where he writes that there are three types: a big, a medium, and a small one. In the opinion of some, he notes, during spring they stay invisible in the ground that is exposed to the sun, and then they appear at dusk. The name of those that soar at the treetops is *zindirwa* (*zi ldir ba*), and there are two kinds of them: one big and one small. Others maintain that there are two kinds, big and small, which are called “strong wild yak of the earth” and “yak of mixed breed¹¹⁵”. Jampel Dorjé agrees that the *sebur* is a beetle of strong smell and adds that it is black, slender, and about the size of a thumb. It has six feet, and a stinking smell comes from its anus (Fig. 12¹¹⁶). In academic literature, opinions differ regarding which beetle the *sebur* might be according to Western identification, but most agree that it is a species of dung beetle or a plant-feeding stink bug¹¹⁷.
- 31 The *sebur* insect is already mentioned in the *King of the Moon* treatise in the chapter on treating diseases of the stomach. There we learn that if *sebur* is mixed with garlic and then combined with water, it might have a healing effect¹¹⁸. When Yutok Yönten Gönpö listed animals and their healing potentials in the twentieth chapter of his *Explanatory Tantras*, he also included the *sebur* insect, stating that “*sebur* and *jingjing tulu* provide relief from the *langtap* (disease¹¹⁹)”. *Langtap* disease (*glang thabs*) can be characterised as painful cramps, which might occur together with indigestion, and which might also be caused by a disturbance of “small animals” (*sin, srin*) living in the human body, especially in the stomach. There are four types of *langtap* disease, namely one hot and one cold type, one due to disturbed internal “small animals” and one caused by “infectious fever” (*nyenrim, gnyan rims*¹²⁰).
- 32 Although Yutok Yönten Gönpö provides the aforementioned instructions for the medicinal use of *sebur*, he does not mention *sebur* in the section of the *Four Tantras* that describes the treatment for “colic” (*langtap*). Despite this absence, the healing potential of *sebur* described in the twentieth chapter of the *Explanatory Tantras* is also known in

other medical treatises¹²¹. Reviewing them, it becomes obvious that *sebur* can be used to treat a range of similar diseases, which are characterized by abdominal pain, indigestion, and *sin* diseases (*srin nad*), among others¹²². It seems that some commentators on the *Four Tantras* were also aware of the discrepancy between the twentieth chapter of the *Explanatory Tantras* and the treatment for “colic”. Therefore, some qualify the use of *sebur* by stating that it heals “colics” caused by “small animals” and “infectious fever¹²³”. Sangyé Gyamtso also provides a creative interpretation, for he dismisses the notion that *sebur* cures “colics” at all, and instead opines that it heals a certain type of fever called *nyentsé* (*gnyan tshad*) (Fig. 4). *Nyentsé* should be understood as inflammation with an increase of temperature at the affected part¹²⁴, and it remains unknown how he found this healing potential. Moreover, Sangyé Gyamtso states that *sebur* can be used when children have “stiff navel” disease, much like *zindira* mentioned above. In the corresponding paragraph of the *Four Tantras*, in the chapter on pediatric diseases in the *Instructional Tantra*, a remedy for a “stiff navel” is described that is comprised of four ingredients: namely *zindi*, beetle ash, and the singed hair of the father and mother, which are all to be cleansed in the child’s urine¹²⁵. Sangyé Gyamtso interprets “*zindi* and beetle ash” as ashes of both *zindi* and beetles, the latter of which he interprets as the “stink beetle” (*sebur*¹²⁶). Therefore he dismisses the healing potential of *sebur* as a treatment for “colics”, as given by Yutok Yönten Gönpo, and recommends *sebur* for treating “the stiff navel of children” instead. Some later doctors, such as Yeshé Penjor (Ye shes dpal ’byor, 1704-1788), agree and supplement traditional healing potentials found in the *Four Tantras* in a similar fashion¹²⁷.

Jingjing tulu (bying bying thu lu)

- 33 The beetle known as *jingjing tulu* is described variously by different Tibetan authors. Namgyel Drakpa Zangpo, for example, writes that some authors maintain that *jingjing tulu* are bees, while others say they are dark red insects that can swim. He is of the opinion that *jingjing tulu* are actually the same as *zindira* (*zi ldi ra*¹²⁸). Kyempa Tsewang explains that they are beetles, which smell and have a hard shell on their backs¹²⁹. Lozang Chödrak states that there are at least two types: some have wings, and some do not¹³⁰. Chökyi Jungné (Chos kyi ’byung gnas, 1699/1700-1774) describes the *jingjing tulu* as an insect with a tail and two antennae, with a flat and wrinkly back¹³¹. Trashibum and Troru Tsenam (Khro ru Tshe rnam, 1926-2004) agree with him and give the same description¹³². Jampel Dorjé provides a divergent opinion, however. He states that *jingjing tulu* is bigger than the *sebur* beetle and is of a globular shape. They have six feet, have wings, and are able to fly. He also claims that they roll human faeces into round balls and carry them to their den (Figs 4, 8¹³³). From these descriptions, it becomes clear that different Tibetan doctors held different opinions regarding the appearance of the *jingjing tulu* insect. These different opinions have also influenced the identifications made in the modern academy, for some scholars think that the *jingjing tulu* is a dung beetle, while others write that it is a stink bug. A third group identifies the *jingjing tulu* as a wingless cockroach¹³⁴.
- 34 When listing *materia medica* and their healing potentials in the twentieth chapter of the *Explanatory Tantra*, Yutok Yönten Gönpo names *sebur* and *jingjing tulu* together as having the potential to cure the *langtap* disease, or “colics¹³⁵”. Similar to *sebur*, however, *jingjing tulu* is not mentioned in the corresponding paragraphs of the *Instructional Tantra*. In other words, such a healing potential is maintained in the *Explanatory Tantra*

but not actually recommended in the *Instructional Tantra*. Also much like the case of *sebur*, medicinal prescriptions of *jingjing tulu* are also known in other medical treatises. For instance, *jingjing tulu* is a part of a drug compound that is used to cure “colics” in the *King of the Moon* treatise¹³⁶. The *jingjing tulu* beetle occurs six times in the *Ten Million Instructions: Relics* written by Nyamnyi Dorjé, and in five cases it is prescribed to alleviate “colics”. Jampel Chökyi Tendzin Trinlé also mentions *jingjing tulu* for the same medicinal purpose in his *A Jewel Mine of Instructions*¹³⁷. Furthermore, this beetle is also employed to cure patients having difficulties with urinating, as explained in the fifty-fourth chapter of the *Instructional Tantra*¹³⁸.

Chubur (chu sbur)

- 35 The *chubur* beetle is traditionally said to treat problems with urination¹³⁹. Its name literally means “water beetle”, and sometimes it is also called the “quick beetle” (*burgyok*, *sbur mgyogs*¹⁴⁰). Usually it is described as a small black beetle that moves quickly in water (Fig. 4¹⁴¹), and Jampel Dorjé adds that it develops from rain water and transforms into a small frog when it gets old. It is also called “one life two bodies” and the “frog with a tail”, because later it is said to become a frog (Fig. 11¹⁴²). Thus, it is obvious that Jampel Dorjé has conflated two animals: a beetle and a frog that is in its larval stage of a tadpole. The names in Mongolian, Manchu, and Chinese also are terms for tadpole¹⁴³. Modern scholars usually identify *chubur* as a water beetle¹⁴⁴, and, as mentioned above, it is usually prescribed for patients who have difficulties urinating. It occurs in a remedy to treat an illness characterised by acute pain and urinary problems¹⁴⁵. In addition, it can also be found in the chapters of the *Four Tantras* dealing with the treatment for “compounded poison” (*jarduk*, *sbyar dug*) and of “non-poisonous substances that have turned into poison” (*gyurduk*, *gyur dug*). Sangyé Gyamtso provides another special application of the beetle for gently cleansing diseases of the “channels¹⁴⁶”. Regardless, it seems that its basic use was for removing problems with the flow of urine, as the treatise of Jampel Chökyi Tendzin Trinlé indicates¹⁴⁷.

Jangpa (byang pa)

- 36 The *jangpa* beetle is generally identified in modern literature as a blister beetle, *Mylabris phalerata* Pallas or *Mylabris cichorii* Fabricius¹⁴⁸. The *jangpa* beetle has various alternative names in Tibetan, however, such as *pemé* (*padme*), “Chinese wheel of fire tongues”, “small tiger lotus”, “golden Mongolian cushion”, “red striped small tiger”, “hero of women diseases”, and others¹⁴⁹. Traditionally Tibetan doctors have classified the beetles as black or black striped, red striped, and gold striped (Figs 4, 13¹⁵⁰). They are said to possess a varying degree of quality, beginning with the black one, which has a superior quality; the black and red striped ones, which have a medium quality; and the golden striped one, which has an inferior quality. Some doctors were of the opinion that one should not use the first type, the black one, because it is poisonous¹⁵¹. The black *jangpa* is not used by Yutok Yönten Gönpö in the *Four Tantras*, for example, and consequently many treatises just distinguish between two types of *jangpa* beetles: namely the red striped ones and the gold striped ones. The former is said to be of good quality and the latter of poor quality. This order of potency also found its expression in the number of insect equivalents. Sönam Yeshé Gyemtzen, for example, writes that

three black beetles are equivalent to seven red striped beetles, and seven red striped beetles equal eleven gold striped beetles¹⁵².

- 37 These equivalencies also vary according to which part of the body of the beetles is being used. It is also usually said that the inner transparent wings should be removed, as they contain poison¹⁵³. Regardless, Darma Gönpö (Darma mgon po, fl. 13th century) writes that some doctors say that one should cut off the head and the legs of the *jangpa* beetle. He remarks that, in his opinion, one should not cut them off, however, because if they have no head and legs they cannot pull out whatever disease they are being used to treat¹⁵⁴. This opinion is shared by Yutok Yönten Gönpö in his *Four Tantras*¹⁵⁵. Nyamnyi Dorjé states that if the *jangpa* beetle is without wings, it will be sharp and quick¹⁵⁶. On a semantic level, using beetles to cleanse the “channels” can be understood as sending the beetles through the “channels” to pull out disease-causing agents. Mipam Gyamtso (Mi pham rgya mtsho, 1846-1912), for example, cites Yutok Yönten Gönpö in describing the *jangpa* beetle as driving the disease through the channels¹⁵⁷. This basic meaning may also be seen in a brief treatment for cleansing the “channels” contained in the *Big Measure of Gold* (*gSer bre chen mo*), which was probably compiled by Drangti Penden Gyeltsen (Brang ti dPal ldan rgyal mtshan, fl. 14th century). The treatment reads:

Seven striped lice without wings (i.e. the striped *jangpa* beetle) ride on the (yellow) “quick beetle”, holding a wheel of iron¹⁵⁸ (and) a club of conch-shell (i.e. sal ammoniac) in their hands, (and wearing) a hat of gold (i.e. fresh sand), finely ground. One should give (this compound) with beer through a younger male relative¹⁵⁹.

- 38 One can probably assume that such compounds, which contained a manageable number of ingredients, were more common than the very elaborate treatments outlined in the *Subsequent Tantra*. Reviewing the medical literature, one finds several instances where the *jangpa* beetle was used to cleanse the “channels”, and it is mentioned several times in this regard as early as the *King of the Moon* treatise¹⁶⁰. Sönam Rinchen (bSod nams rin chen, 1079-1153) sees *jangpa* beetles as an important ingredient in drugs used to cleanse the “channels”¹⁶¹. Darma Gönpö gives a very detailed discussion that should be compared to the Yönten Gönpö’s description in the *Subsequent Tantra*¹⁶². *Jangpa* beetle prescriptions are also found in the collection of medical treatises named *A Fist of Hundred Thousands* (*Bum khu tshur*) that mainly consists of works recorded by Chakmen Ringyel (Phyag sman Rin rgyal, ca. 15th century). Both treatises represent lineages of knowledge that was handed down in the Cherjé (Cher rje) and Chakmen (Phyag sman) medical schools, respectively¹⁶³. The same can be said about the Drangti (Brang ti) school, for in addition to the aforementioned formula attributed to Penden Gyeltsen, compounds containing *jangpa* beetles can also be found in the *The Measure of Silver* (*dNgul bre*) that was probably authored by Dorjé Pelzang (Rdo rje dpal bzang), who flourished during the 15th and 16th centuries¹⁶⁴. In the 15th century, the cleansing of the “channels” by *jangpa* beetles is also found in the medical writings of Namgyel Drakpa Zangpo and Nyamnyi Dorjé¹⁶⁵. These works clearly represent the traditions of later medical schools, the Jangluk (Byang lugs) and the Zurluk (Zur lugs), respectively. Cleansing the “channels” with *jangpa* beetles was also known in later times, as the works of Yeshé Penjor show¹⁶⁶. Thus, it is obvious that this therapy was of great importance for generations of Tibetan doctors¹⁶⁷.
- 39 Instead of providing an overview of cleansing the “channels”, however, here we shall consider how a doctor decided whether a *jangpa* beetle is of good or poor quality. It seems that this method can be traced back to Jinamitra, possibly the father of Kyebu

Melha (Skyes bu Me lha, fl. 11th century¹⁶⁸). There are four criteria that are considered in this process: namely (1) the type of *jangpa* beetle, (2) the season in which they were collected, (3) the locality, and (4) the way in which they were killed, all of which are addressed by Yutok Yönten Gönpö, Darma Gönpö, the anonymous author whose work is included in the *A Fist of Hundred Thousands*, and Tendzin Püntsok¹⁶⁹. As mentioned above, beetles that have red stripes are of good quality, but if they have gold stripes, they are considered to be of poor quality. The best time to collect *jangpa* beetles is autumn, the first month of autumn in particular, when the rainy season has ended. They should be collected among the *sema* plant (*srad ma*) and the thorns of the *kyiwa* plant (*skyi ba*), especially if they have died suddenly¹⁷⁰. If one collects beetles at the end of spring and during the rainy season, when they have been frozen following the rains, they are of poor quality. The same applies to beetles living among the leaves of the *yokmo* shrub (*yog mo*) and that have died naturally or have been injured¹⁷¹.

Concluding remarks

- 40 It is evident that animals and their by-products were an integral part of Tibetan medicine, even though it is not possible to provide a precise quantitative analysis. For this, one would have to carry out a survey of the Tibetan *materia medica* that are used in drugs and other therapies¹⁷². This is by no means the only unresolved issue in our current knowledge of the use of animals in Tibetan medicine.
- 41 Certainly, one must also critically question the currently available publications on Tibetan *materia medica*, for they are generally not based on appropriate studies of *materia medica* terminology. Some authors just copy identifications that are given in previous works, and very often the proposed Western identification is influenced by or borrowed from the established identification of Chinese *materia medica*. This does not just concern insects studied in this article but concerns animals used in Tibetan medicine in general¹⁷³.
- 42 In some cases, the actual existence of the proposed animal or insect and its medicinal application remains unclear and more information would be necessary for proper identification. This applies to the *zhobur* insect, for example, as well as the *trumembu*. The use of ants also needs further inquiry, for although ants populate the Himalayan regions, Tibet, and Mongolia¹⁷⁴, further research would be needed to determine which species are used and whether ants are indeed used by Tibetan doctors at all. It is known that ants are used for medicinal purpose in regions adjacent to Tibet, however, such as Mongolia and China¹⁷⁵. A thorough comparison of the insects used in the Chinese medical tradition could help elucidate the insects that are used in Tibetan medicines. Such research would go well beyond the scope of this preliminary study, however, as it would require the analysis of compounded drugs, and not just single ingredients, based on a systematic survey of the relevant Chinese medical sources. Thus, it might be interesting to see which butterflies, or more likely their caterpillars, were used in Chinese medicine to treat stomach diseases. Also, the use of the cicada slough for paediatric ailments and other illnesses should be analysed in future research¹⁷⁶. Possibly these very specific applications of insects in Tibetan medicine could demonstrate a Chinese influence in the medical system of the neighbouring country.
- 43 In another example, the *jingjing tulu* beetle, which should be identified as the *Coridius chinensis* Dallas or *Eupolyphaga sinensis* Walker, is specifically given in case of colics". In

modern Chinese medicine, one of the medicinal applications of *Aspongopus chinensis* Dallas alias *Coridius chinensis* Dallas (九香蟲) can be to alleviate stomach pain and treat gastrointestinal diseases¹⁷⁷. Moreover, the use of the *shadrang* fly appears to have a Chinese background, for it seems that there is no use in the Tibetan medical tradition other than as an ingredient for “restoring virility”. Notably, Nyamnyi Dorjé states that this particular remedy represents the instructions of the king of the eastern capital in China¹⁷⁸. In other words, such uses of the *shadrang* fly might be a Chinese remedy that was integrated into Tibetan medicine. Insects such as horseflies are well-known in Chinese medicine and are the subject of current academic research¹⁷⁹. Perhaps there also is a Chinese background for the medicinal use of the *jangpa* beetle in Tibet, but it could also be a feature that has not been borrowed, but is shared by both medical systems. In sum, the number of medicinal insects in Tibetan medicine is limited, and their uses are very specific. Perhaps this degree of specificity indicates origins and influences from neighbouring medical traditions.

Figure 1. An anthill (edited)

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Figure 2. The *jetak* butterfly and the *zhobur* insect (from left to right) (edited)

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Figure 3. The small and big *zindira* insect and the *chagapa* grasshopper (from left to right) (edited)

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Figure 4. The *jangpa* beetle, the *diksin* crab, the *chubur* beetle (above), the *sebur* beetle (below), the *jingjingtulu* beetle/bug and the *truma* worm (from left to right) (edited)

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Figure 5. The *kalanta* bird (edited)

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Figure 6. The *drokma* ant (edited)

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Figure 7. The *truma* worm and the *zhobur* insect (edited)

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Figure 8. The *jingjingtulu* beetle / bug and the *zindira* insect (From left to right) (edited)

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Figure 9. The *chemalep* butterfly (edited)

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Figure 10. The *chagapa* grasshopper (right) (edited)

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Figure 11. The *chubur* beetle (left) (edited)

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Figure 12. The *sebur* beetle (far right) (edited)

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Figure 13. The *jangpa* beetle (edited)

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APPENDIXES

chagapa (cha ga pa)

All authors agree that is a kind of grasshopper but disagree which it is exactly. A few prefer the *Oxya chinensis* Thunberg. Most identify it as *Patanga japonica* Bolivar. In the opinion of Luo 1997, one has to distinguish between a common grasshopper (*cha ga pa*) and the grasshopper of the valleys (*rong cha ga pa*). The former is the *Patanga japonica* and the latter a cicada.

(i)	<i>Oxya chinensis</i> Thunberg	Dga' ba'i rdo rje 1995, p. 374; Pasang Yonten Arya 1998, p. 63;
(ii)	<i>Patanga japonica</i> Bolivar	Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo 1991, p. 491; Parfionovitch <i>et al.</i> 1992, p. 233; Karma chos 'phel 1993, p. 698; Qinghaisheng yaopin jianyan suo 1996, vol. 3, p. 93; Rnam rgyal thar 2006, p. 205; Dgra 'dul 2009, p. 239;
(iii)	1. <i>Patanga japonica</i> (Bolivar) (<i>cha ga pa</i>) 2. <i>Cryptotympana pustulata</i> Fabricius (<i>rong cha ga pa</i>)	Luo 1997, p. 300.

chubur (chu sbur)

One scholar gives the family of water beetles. Others are more specific and identify it as *Cybister tripunctatus orientalis* Gschwendtner which is a synonym for *Cybister tripunctatus lateralis* Fabricius.

(i)	Dytiscidae	Parfionovitch <i>et al.</i> 1992, p. 227;
(ii)	<i>Cybister tripunctatus orientalis</i> Gschwendtner	Dga' ba'i rdo rje 1995, p. 374; Pasang Yonten Arya 1998, p. 66; Rnam rgyal thar 2006, p. 219.

gowo (go bo)

All scholars are in agreement that the bird called gowo is the *Gypaetus barbatus* (*hemachalanus*) Hutton, p.

(i)	<i>Gypaetus barbatus</i> (hemachalanus) Hutton	Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo 1991, p. 479; Parfionovitch <i>et al.</i> 1992, p. 233; Karma chos 'phel 1993, p. 656; Dga' ba'i rdo rje 1995, p. 361; Qinghaisheng yaopin jianyan suo 1996, vol. 3 p. 52; Luo 1997, p. 313; Pasang Yonten Arya 1998, p. 35; Bod ljongs sman rtsis khang gso rig zhib 'jug khang 2007, p. 831; Dgra 'dul 2009, p. 194; Rnam rgyal thar 2006, p. 164.
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gyakye (rgya skyegs)

There is a general consensus that *gyakye* is the lac insect or the lac itself. It seems that a few authors regard the term as pointing out to the host plant.

(i)	<i>Laccifer lacca</i> Kerr	Xizang deng weishengju 1979, p. 83; Yang Jingsheng and Chucheng jiangcuo 1987, p. 59; Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo 1991, p. 60; Karma chos 'phel 1993, p. 129; Dga' ba'i rdo rje 1995, p. 123; Qinghaisheng yaopin jianyan suo 1996, vol. 2 p. 50;
(ii)	red lac	Pasang Yonten Arya 1998, p. 43;
(iii)	shellac, derived from <i>Ficus</i> sp.	Parfionovitch <i>et al.</i> 1992, pp. 81, 237;
(iv)	<i>gyakye</i> tree	Clark 1995, p. 169;
(v)	1. shellac 2. <i>Laccifer lacca</i>	Thinley Gyatso and Hakim 2010, p. 166;
(vi)	1. <i>Laccifer lacca</i> Kerr 2. <i>Eriolaena</i> spp.	Luo 1997, p. 301.

jagö (bya rgod)

Modern scholars agree that the *jagö* is the cinereous vulture. Two authors just state that the *jagö* is a (Himalayan) vulture.

(i)	<i>Aegypius</i> (Linnaeus) <i>monachus</i>	Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo 1991, p. 518; Karma chos 'phel 1993, p. 654; Dga' ba'i rdo rje 1995, p. 367; Qinghaisheng yaopin jianyan suo 1996, vol. 2, p. 142; Luo 1997, p. 312; Bod ljongs sman rtsis khang gso rig zhib 'jug khang 2007, p. 812; Dga 'dul 2009, p. 191; Rnam rgyal thar 2006, p. 161;
(ii)	Himalayan vulture	Parfionovitch <i>et al.</i> 1992, p. 67, 213, 233, 243; Pasang Yonten Arya 1998, p. 155).

jangpa (byang pa)

Modern authors disagree about which species *jangpa* refers. Some are of the opinion that *jangpa* is *Mylabris phalerata* Pallas, but others identify it with *Mylabris cichorii* Fabricius. Two scholars give both species. Furthermore, the author of one publication prefer not to specify it further, p.

(i)	<i>Mylabris</i> sp.	Parfionovitch <i>et al.</i> 1992, p. 71, 227, 273;
(ii)	<i>Mylabris phalerata</i> Pallas	Xizang deng weishengju 1979, p. 79; Yang Jingsheng and Chucheng jiangcuo 1987, p. 79; Dga' ba'i rdo rje 1995, p. 379; Qinghaisheng yaopin jianyan suo 1996, vol. 2, p. 147; Pasang Yonten Arya 1998, p. 158;
(iii)	<i>Mylabris cichorii</i> Fabricius	Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo 1991, p. 519; Karma chos 'phel 1993, p. 696; Bod ljongs sman rtsis khang gso rig zhib 'jug khang 2007, p. 855; Dgra 'dul 2009, p. 237; Rnam rgyal thar 2006, p. 203;
(iv)	1. <i>Mylabris phalerata</i> Pallas, 2. <i>Mylabris cichorii</i> Fabricius	Clark 1995, p. 182; Luo 1997, p. 303.

jelep sertra (bye leb ser khra)

The term *jelep sertra* can be rendered as yellow mottled butterfly. There exist other Tibetan terms for butterfly as well such as *chemalep (phye ma leb)*, which can also denote a moth. Occasionally one also finds the term *jetak (bye stag)* which can be used as a synonym for both terms. Some Western authors writes that it might mean any

butterfly. Other are more specific and identify it as the common yellow swallowtail, the eastern pale clouded yellow, or the high-altitude butterfly *Parnassius imperator*. One author provides two identifications.

(i)	butterfly / Lepidoptera	Pasang Yonten Arya 1998, p. 162 (<i>phye ma leb</i>); Dašieva 2001, p. 726 (<i>bye stag</i>);
(ii)	<i>Papilio machaon</i> L.	Dga' ba'i rdo rje 1995, p. 380 (<i>bye leb ser khra</i>); Dgra 'dul 2009, p. 240 (<i>phye ma leb</i>);
(iii)	<i>Colias erate</i> Esper	Qinghaisheng yaopin jianyan suo 1996, p. vol. 3 221 (<i>bye ma leb ser khra</i>);
(iv)	<i>Parnassius imperator musageta</i> Grum-Grshimailo	Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo 1991, p. 521 (<i>bye stag khra bo</i>); Karma chos 'phel 1993, p. 701 (<i>phye ma leb</i>); Parfionovitch <i>et al.</i> 1992, p. 235 (<i>bye stag</i>); Rnam rgyal thar 2006, p. 206 (<i>bye leb ser khra</i>);
(v)	1. <i>Colias erate</i> Esper (<i>bye leb ser khra</i>) 2. <i>Parnassius imperator musageta</i> Grum-Grshimailo (<i>bye stag khra bo</i>)	Luo 1997, p. 302.

jingjingtulu (bying bying thu lu)

The opinions vary with regard to its identification. Some think it is the dung beetle *Scarabaeus sacer*, whereas others state that it is the stink bug (*Aspongopus chinensis* Dallas is a synonym for *Coridius chinensis* Dallas). Several scholars, however, prefer the identification of a wingless cockroach.

One author gives two identification but without specifying it further.

(i)	<i>Scarabaeus sacer</i>	Parfionovitch <i>et al.</i> 1992, p. 227; Dašieva 2001, p. 88, 327;
(ii)	<i>Aspongopus chinensis</i> Dallas	Karma chos 'phel 1993, p. 696; Rnam rgyal thar 2006, p. 202;
(iii)	<i>Eupolyphaga sinensis</i> Walker	Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo 1991, p. 520; Dga' ba'i rdo rje 1995, p. 379; Qinghaisheng yaopin jianyan suo 1996, vol. 3, p. 211; Luo 1997, p. 300; Pasang Yonten Arya 1998, p. 161; Dgra 'dul 2009, p. 236;

(iv)	1. dung beetle 2. scarab beetle	Clark 1995, p. 182.
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kyiwa (skyi ba)

In the literature on Tibetan *materia medica*, there is an agreement that the *kyiwa* plant belongs to the genus *Sophora*. Some of the scientific names represent synonyms. *Sophora moorcroftiana* var. *davidii* Franch. and *Sophora viciifolia* Hance are alternative names of *Sophora davidii* (Franch.) Pavol.

(i)	<i>Sophora davidii</i> (Franch.) Pavol.	Dga' ba'i rdo rje 1995, p. 116; Pasang Yonten Arya 1998, p. 15;
(ii)	<i>Sophora moorcroftiana</i> (Benth.) Baker	Bod rang skyong ljongs gsar brje u yon lhan khang gi 'phrod bstun cus 1973, p. 226, pl. 116; Gurmet Namgyal and Phuntsog 1990, p. 314; Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo (Northwest Institute of Plateau Biology, Chinese Academy of Sciences) (ed.) 1991, p. 16; Parfionovitch <i>et al.</i> 1992, pp. 69, 81, 225, 237; Karma chos 'phel 1993, p. 57; Clark 1995, p. 172; Qinghaisheng yaopin jianyan suo 1996, vol. 3, p. 27; Luo 1997, p. 141; Tian 1997, p. 160; Dawa 1999, p. 314; Dašieva 2001, p. 744; Bod ljongs sman rtsis khang gso rig zhib 'jug khang 2007, p. 539;
(iii)	1. <i>Sophora davidii</i> (Franch.) Pavol. 2. <i>Sophora moorcroftiana</i> Benth. var. <i>davidii</i> Franch. 3. <i>Sophora viciifolia</i> Hance	Yang Jingsheng and Chucheng jiangcuo 1987, p. 127.

rakshamikmé (raksha mig med)

There is an agreement that it is an ant. Some authors consider it the common black colored ant.

(i)	ant	Pasang Yonten Arya 1998, p. 242;
(ii)	<i>Formica</i>	Parfionovitch <i>et al.</i> 1992, pp. 75, 231;

(iii)	<i>Formica fusca</i> L.	Dga' ba'i rdo rje 1995, p. 384; Rnam rgyal thar 2006, p. 207; Dgra 'dul 2009, p. 241.
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sebur (bse sbur)

There is some disagreement what *sebur* is. One author refers to beetles of the *Blaps* genus. Another states that is a species of dung beetle. Parfionovitch *et al.* 1992 gives a slightly confusing statement by saying that it are beetles (coleopterae) and then adds stink bugs. Indeed many scholars consider *sebur* to be *Nezara viridula*, a plant-feeding stink bug. This also applies to Luo 1997 but he also provides a further possible identification, a certain species of dung beetle. Clark 1995 differs significantly by providing three potential identifications, namely the oriental cockroach, the American cockroach or a species of dung beetle.

(i)	<i>Blaps</i> spp.	Dašieva 2001, p. 88;
(ii)	<i>Catharsius molossus</i> L.	Qinghaisheng yaopin jianyan suo 1996, vol.3, p. 376;
(iii)	Coleopterae (stink bug)	Parfionovitch <i>et al.</i> 1992, p. 227;
(iv)	<i>Nezara viridula smaragdula</i> Fabricius	Yang Jingsheng and Chucheng jiangcuo 1987, p. 99; Karma chos 'phel 1993, p. 695; Rnam rgyal thar 2006, p. 201; Dgra 'dul 2009, p. 235;
(v)	1. <i>Catharsius molossus</i> L. (<i>bse sbur</i>) 2. <i>Nezara viridula smaragdula</i> Fabricius (<i>bse bo</i>)	Luo 1997, p. 303;
(vi)	1. <i>Blatta orientalis</i> L. 2. <i>Periplaneta Americana</i> 3. <i>Geotrupes laevistriatus</i>	Clark 1995, p. 182.

sema (srad ma)

In Tibetan medicine, there are several types depending on the color. In Western literature, the white type (*sekar*, *srad dkar*), blue-greenish type (*sengön*, *srad sngon*) and the black type (*senak*, *srad nag*) are usually regarded as a plant in the genera *Astragalus* and *Oxytropis*. The yellow type (*seser*, *srad ser*) is mainly identified as a species of the genera *Astragalus* and *Hedysarum*. The red type (*semar*, *srad dmar*) is said to belong to the genus *Hedysarum*. Plants of the brownish type (*semuk*, *srad smug*) are classified as plants from the genera *Tibetia*, *Astragalus* and *Oxytropis*. Some of designations are synonyms. *Astragalus yunnanensis* var. *tatsienensis* (Bureau & Franch.) Cheng f. is a synonym of

Astragalus tatsienensis Bureau & Franch. The name *Gueldenstaedtia himalaica* Baker is a synonym of *Tibetia himalaica* (Baker) H.P.Tsui.

(A) (sekar)

(i)	<i>Astragalus</i> sp.	Gurmet Namgyal and Phuntsog 1990, p. 320; Dašieva, D. B. 2001, p. 726;
(ii)	<i>Astragalus floridus</i> Bunge	Dga' ba'i rdo rje 1995, p. 309; Pasang Yonten Arya 1998, p. 282;
(iii)	<i>Astragalus yunnanensis</i> Fr.	Bod rang skyong ljongs gsar brje u yon lhan khang gi 'phrod bsten cus 1973, p. 541, pl. 342;
(iv)	<i>Oxytropis</i> sp.	Thinley Gyatso and Hakim 2010, p. 281;
(v)	<i>Oxytropis ochrantha</i> Turcz.	Dawa 1999, p. 242;
(vi)	<i>Oxytropis kansuensis</i> Bunge	Bod ljongs sman rtsis khang gso rig zhib 'jug khang 2007, p. 267;
(vii)	1. <i>Oxytropis kansuensis</i> Bunge 2. <i>Oxytropis ochrocephala</i> Bunge	Karma chos 'phel 1993, p. 449; Qinghaisheng yaopin jianyan suo 1996, vol. 1, p. 534; Luo 1997, p. 138;
(viii)	1. <i>Astragalus yunnaneensis</i> 2. <i>Oxytropis oxyphylla</i>	Clark 1995, p. 170;
(ix)	1. <i>Astragalus acaulis</i> Baker 2. <i>Astragalus tatsienensis</i> Bureau & Franch. 3. <i>Oxytropis kansuensis</i> Bunge	Yang Jingsheng and Chucheng jiangcuo 1987, p. 623;
(x)	1. <i>Astragalus galactites</i> Pall. 2. <i>Astragalus yunnanensis</i> Franch. 3. <i>Oxytropis ochrocephala</i> Bunge	Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo 1991, p. 418;
(xi)	1. <i>Astragalus</i> sp. 2. <i>Hedysarum</i> sp.	Parfionovitch <i>et al.</i> 1992, pp. 69, 225.

(B) (seser)

(i)	<i>Taverniera nummularia</i> DC.	Tsering Dorjee Dekhang 2008, p. 184;
(ii)	<i>Astragalus pulvinatus</i> P.C.Li et Ni	Chen Jiahui and Yang Yong 2010, p. 84;
(iii)	<i>Astragalus yunnanensis</i> var. <i>tatsienensis</i> (Bureau & Franch.) Cheng f.	Dga' ba'i rdo rje 1995, p. 310; Pasang Yonten Arya 1998, p. 283;

(iv)	<i>Astragalus floridus</i> Bunge	Bod rang skyong ljongs gsar brje u yon lhan khang gi 'phrod bsten cus 1973, p. 541, pl. 344; Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo 1991, p. 422; Pa sang yon tan 1994, p. 78; Tsarong 1994, p. 78; Karma chos 'phel 1993, p. 452; Bod ljongs sman rtsis khang gso rig zhib 'jug khang 2007, p. 269;
(v)	1. <i>Astragalus floridus</i> Bunge 2. <i>Astragalus chrysopterus</i> Bunge	Luo 1997, p. 127;
(vi)	1. <i>Astragalus ernestii</i> H.F.Comber 2. <i>Hedysarum thiochroum</i> Hand.-Mazz. 3. <i>Astragalus prattii</i> G.Simpson	Yang Jingsheng and Chucheng jiangcuo 1987, p. 631;
(vii)	1. <i>Hedysarum polybotrys</i> Hand.-Mazz. 2. <i>Hedysarum citrinum</i> Baker f.	Qinghaisheng yaopin jianyan suo 1996, vol. 1, p. 539.

(C) (*sengön*)

(i)	<i>Astragalus pastori</i> H.T.Tsai & T.F.Yu	Dga' ba'i rdo rje 1995, p. 309; Pasang Yonten Arya 1998, p. 282;
(ii)	<i>Astragalus tanguticus</i> Batalin	Luo 1997, p. 129;
(iii)	<i>Oxytropis melanocalyx</i> Bunge	Karma chos 'phel 1993, p. 451; Qinghaisheng yaopin jianyan suo 1996, p. vol. 1 536;
(iv)	1. <i>Oxytropis melanocalyx</i> Bunge 2. <i>Astragalus skythreops</i> Bunge 3. <i>Astragalus licentianus</i> Hand.-Mazz.	Yang Jingsheng and Chucheng jiangcuo 1987, p. 625;
(v)	1. <i>Astragalus tanguticus</i> Batalin 2. <i>Oxytropis melanocalyx</i> Bunge 3. <i>Hedysarum tuberosum</i> B.Fedtsch.	Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo 1991, p. 424.

(D) (*senak*)

(i)	1. <i>Astragalus kialensis</i> G.Simpson 2. <i>Astragalus josephi</i> E.Peter	Yang Jingsheng and Chucheng jiangcuo 1987, p. 627;
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(ii)	1. <i>Oxytropis coerulea</i> (Pall.) DC. 2. <i>Astragalus bhotanensis</i> Baker	Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo 1991, p. 420;
(iii)	<i>Astragalus kialensis</i> G.Simpson	Karma chos 'phel 1993, p. 450 ;
(iv)	<i>Oxytropis subpodoloba</i> P.C. Li	Dga' ba'i rdo rje 1995, p. 309; Pasang Yonten Arya 1998, p. 282;
(v)	<i>Hedysarum sikkimense</i> Benth.	Qinghaisheng yaopin jianyan suo 1996, vol. 1, p. 537;
(vi)	1. <i>Astragalus kialensis</i> G. Simpson 2. <i>Astragalus josephi</i> E. Peter	Luo 1997, p. 127.

(E) (*semar*)

(i)	<i>Hedysarum sikkimense</i> Benth.	Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo 1991, p. 421;
(ii)	1. <i>Hedysarum sikkimense</i> Baker 2. <i>Hedysarum tanguticum</i> B.Fedtsch. 3. <i>Hedysarum pseudastragalus</i> Ulbr.	Yang Jingsheng and Chucheng jiangcuo 1987, p. 628;
(iii)	<i>Hedysarum sikkimense</i> Baker	Karma chos 'phel 1993, p. 451; Dga' ba'i rdo rje 1995, p. 310; Pasang Yonten Arya 1998, p. 283;
(iv)	<i>Hedysarum multijugum</i> Maxim.	Qinghaisheng yaopin jianyan suo 1996, vol. 3, p. 368;
(v)	<i>Hedysarum pseudastragalus</i> Ulbr.	Luo 1997, p. 137.

(F) (*semuk*)

(i)	1. <i>Gueldenstaedtia himalaica</i> Baker 2. <i>Oxytropis yunnanensis</i> Franch. 3. <i>Astragalus polycladus</i> Bureau & Franch.	Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo 1991, p. 426;
(ii)	1. <i>Astragalus sungpanensis</i> E.Peter 2. <i>Astragalus degensis</i> Ulbr. var. <i>rockianus</i> Peter-Stiba	Yang Jingsheng and Chucheng jiangcuo 1987, p. 630;
(iii)	<i>Hedysarum pseudastragalus</i> Ulbr.	Karma chos 'phel 1993, p. 448;
(iv)	<i>Gueldenstaedtia himalaica</i> Baker	Dga' ba'i rdo rje 1995, p. 308; Pasang Yonten Arya 1998, p. 283;

(v)	<i>Astragalus yunnanensis</i> Franch.	Qinghaisheng yaopin jianyan suo 1996, vol. 1, p. 543;
(vi)	<i>Astragalus polycladus</i> Bureau & Franch.	Luo 1997, p. 128;
(vii)	<i>Oxytropis glacialis</i> Benth. ex Bge.	Chen Jiahui and Yang Yong 2010, p. 87.

shadrang (sha sbrang)

One author only provides an identification for *shadrang*. According to him, it is a certain fly, *Atylotus bivittateinus* Takahasi, a synonym of *Atylotus miser* Szilady.

(i)	<i>Atylotus bivittateinus</i> Takahasi	Luo 1997, p. 302.
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truma (spru ma)

In Tibetan tradition the plant *truma* is usually divided into a bright or white type (*truma karmo, spru ma dkar po*) and a dark or black type (*truma nakpo, spru ma nag po*). These can be further distinguished by a superior bright type (*truma karmo chok, spru ma dkar po mchog*) and an inferior bright type (*truma karmo menpa, spru ma dkar po dman pa*). One author knows of an inferior dark type (*truma nakpo menpa, spru ma nag po dman pa*) but a superior dark type is not mentioned. Occasionally one finds a yellow type (*truma serpo, spru ma ser po*). The genera of the identified plants widely vary and include *Heracleum*, *Notopterygium*, *Valeriana*, *Angelica*, *Thalictrum*, *Aralia* and *Actaea*. Some plant names are still unresolved such as *Heracleum wallichii* DC. and *Heracleum lallii* C.Norman. Some are a just synonyms. *Heracleum dissectum* Ledeb. is a synonym of *Heracleum sphondylium* subsp. *montanum* (Schleich. ex Gaudin) Briq. The same can said for *Souliea vaginata* (Maxim.) Franch. which is *Actaea vaginata* (Maxim.) J.Compton. The plant *Notopterygium forbesii* H.Boissieu is an alternative name for *Notopterygium franchetii* H.Boissieu. The plant name *Angelica dahurica* var. *formosana* (H. Boissieu) Shan & Yuan is a another name of *Angelica dahurica* var. *formosana* (Boissieu) Yen.

(A) (truma in general)

(i)	<i>Heracleum candicans</i> Wall. ex DC.	Institute of Traditional Medicine Services 1999, p. 76;
(ii)	<i>Heracleum dissectum</i> Ledeb.	Dašieva, D. B. 2001, p. 727;
(iii)	1. <i>Heracleum scabridum</i> Franch. 2. <i>Notopterygium incisum</i> C. C. Ting ex H. T. Chang 3. <i>Valeriana fauriei</i> Brig.	Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo 1991, p. 202;
(iv)	1. <i>Notopterygium incisum</i> K.C.Ting ex H.T.Chang 2. <i>Notopterygium forbesii</i> Boiss.	Luo 1997, p. 173.

(B) (*truma karmo*)

(i)	<i>Heracleum candicans</i> Wall. ex DC.	Bod rang skyong ljongs gsar brje u yon lhan khang gi 'phrod bsten cus 1973, p. 337, pl. 196; Yang Jingsheng and Chucheng jiangcuo 1987, p. 415; Gurmet Namgyal and Phuntsog 1990, p. 317; Karma chos 'phel 1993, p. 225; Dga' ba'i rdo rje 1995, p. 240; Qinghaisheng yaopin jianyan suo 1996, vol. 3, p. 184; Luo 1997, p. 172; Pasang Yonten Arya 1998, p. 137; Tenzin Dakpa 2007, p. 134; Bod ljongs sman rtsis khang gso rig zhib 'jug khang 2007, p. 302; Tsering Dorjee Dekhang 2008, p. 90;
(ii)	<i>Heracleum lanatum</i> Michx.	Kala 2003, p. 127;
(iii)	1. <i>Heracleum wallichii</i> DC. 2. <i>Heracleum candicans</i> Wall. ex DC. 3. <i>Heracleum millefolium</i> Diels	Parfionovitch <i>et al.</i> 1992, pp. 71, 73, 229, 237.

(C) (*truma karmo chok*)

(i)	<i>Angelica dahurica</i> (Fisch. ex Hoffm.) Benth. & Hook f.	Yang Jingsheng and Chucheng jiangcuo 1987, p. 417;
(ii)	<i>Angelica dahurica</i> (Fisch. ex Hoffm.) Benth. & Hook f. var. <i>formosana</i> (Boiss.) Shan. et Yuan	Luo 1997, p. 168;
(iii)	<i>Heracleum millefolium</i> Diels	Luo 1997, p. 173.

(D) (*truma karmo menpa*)

(i)	<i>Thalictrum petaloideum</i> L.	Luo 1997, p. 83.
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(E) (*truma nakpo*)

(i)	<i>Aralia atropurpurea</i> Franch.	Bod rang skyong ljongs gsar brje u yon lhan khang gi 'phrod bsten cus 1973, p. 339, pl. 197; Gurmet Namgyal and Phuntsog 1990, p. 317;
(ii)	<i>Aralia</i> sp.	Tenzin Dakpa 2007, p. 135;

(iii)	1. <i>Aralia apioides</i> Hand.-Mazz. 2. <i>Aralia atropurpurea</i> Franch.	Yang Jingsheng and Chucheng jiangcuo 1987, p. 418; Luo 1997, p. 166;
(iv)	<i>Heracleum lallii</i> C.Norman	Pa sang yon tan 1994, p. 95; Tsarong 1994, p. 95;
(v)	<i>Heracleum lanatum</i> Michx.	Kala 2003, p. 127;
(vi)	<i>Angelica paeoniifolia</i> R.H.Shan & C.C.Yuan	Zla ba mngon dga' 2004, p. 80;
(vii)	1. <i>Heracleum dissectum</i> Ledeb. 2. <i>Aralia atropurpurea</i> Franch. 3. <i>Angelica</i> sp.	Parfionovitch <i>et al.</i> 1992, p. 229;
(viii)	<i>Notopterygium incisum</i> C. C. Ting ex H. T. Chang	Karma chos 'phel 1993, p. 226; Bod ljongs sman rtsis khang gso rig zhib 'jug khang 2007, p. 304;
(ix)	<i>Notopterygium forbesii</i> H.Boissieu	Dga' ba'i rdo rje 1995, p. 240; Pasang Yonten Arya 1998, p. 137;
(x)	1. <i>Notopterygium incisum</i> Ting 2. <i>Notopterygium franchetii</i> H.Boissieu	Xizang deng weishengju 1979, p. 56;
(xi)	1. <i>Notopterygium incisum</i> Ting 2. <i>Notopterygium forbesii</i> H.Boissieu	Qinghaisheng yaopin jianyan suo 1996, p. vol. 3 186.

(F) (*truma nakpo menpa*)

(i)	<i>Souliea vaginata</i> (Maxim.) Franch.	Yang Jingsheng and Chucheng jiangcuo 1987, p. 420; Luo 1997, p. 80.
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(G) (*truma serpo*)

(i)	<i>Heracleum scabridum</i> Franch.	Yang Jingsheng and Chucheng jiangcuo 1987, p. 420; Luo 1997, p. 173;
(ii)	<i>Notopterygium incisum</i> K.C.Ting ex H.T.Chang	Dga' ba'i rdo rje 1995, p. 240; Pasang Yonten Arya 1998, p. 137.

trumembu (spru ma'i 'bu)

There are just a few scholars providing an identification. Two are of the opinion that is a chrysalis of caterpillars, whereas one also adds a literal rendering of *trumembu*, namely moxa insect.

(i)	caterpillar chrysalis	Parfionovitch <i>et al.</i> 1992, p. 227; Pasang Yonten Arya 1998, p. 137;
(ii)	moxa insect, chrysalis	Clark 1995, p. 182.

yokmo (yog mo)

Two authors identify it with *Rabdosia rubescens* (Hamst.) C. Y. Wu et Hsuan but it is an incorrect and it is not fully clear which plant is meant. Presumably, they meant *Plectranthus rubescens* Hemsl. It is a synonym for *Isodon rubescens* (Hemsl.) H.Hara. All other scholars regard it as an *Artemisia* species but it varies which one.

(i)	<i>Rabdosia rubescens</i> (Hamst.) C. Y. Wu et Hsuan	Dga' ba'i rdo rje 1995, p. 282; Pasang Yonten Arya 1998, p. 234;
(ii)	<i>Artemisia</i> spp.	Dašieva, D. B. 2001, p. 741; Kletter and Kriechbaum 2001, p. 317;
(iii)	<i>Artemisia capillaris</i> Thunb.	Bod ljongs sman rtsis khang gso rig zhib 'jug khang 2007, p. 524;
(iv)	<i>Artemisia desertorum</i> Spreng.	Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo 1991, p. 328; Qinghaisheng yaopin jianyan suo 1996, vol. 2, p. 234;
(v)	<i>Artemisia nanschanica</i> Krasch.	Chen Jiahui and Yang Yong 2010, p. 146;
(vi)	<i>Artemisia stricta</i> Edgew.	Bod rang skyong ljongs gsar brje u yon lhan khang gi 'phrod bstun cus 1973, p. 382, pl. 230; Parfionovitch <i>et al.</i> 1992, p. 73, 229; Karma chos 'phel 1993, p. 240.

zindira (zi ldi ra)

Two authors only deal with *zindira*. Both are of the opinion that it are Cicadidae.

(i)	Cicadidae	Parfionovitch <i>et al.</i> 1992, p. 233; Dašieva 2001, p. 369.
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NOTES

1. I am grateful to Shane Suvikapakornkul, Serindia Publications, for his generous permission to reproduce details from the Tibetan Medical Paintings. I want to thank Nathan Hill for sending me a rare article on medicinal insects in the Mongolian medical tradition and Jan Seifert for editing the images of this paper. I would also like to extend special thanks to William McGrath for his careful English editing of this essay. I am also thankful to both anonymous reviewers for their amendments, comments and suggestions. All mistakes that remain are my own.

2. Alves *et al.* 2014.

3. Alves & Rosa 2005, p. 2.

4. Still 2003, pp. 118ff., Alves & Rosa 2005, pp. 2ff.

5. Feng *et al.* 2009, p. 315.

6. Lokeshwari & Shantibala 2010.

7. Costa-Neto 2005, pp. 105ff., Feng *et al.* 2009, p. 314, Mans *et al.* 2016.

8. Shrivastava & Prakash 2015.

9. Wang 1989, Costa-Neto 2005, p. 107, Verma & Prasad 2012, Mans *et al.* 2016, pp. 386f.

10. Still 2003, p. 118.

11. Alves & Rosa 2005, p. 2.

12. Feng *et al.* 2009, p. 313.

13. *Ibid.*

14. Unnikrishnan 1998, p. 2. On both texts, see Wujastyk 2003, pp. 39ff., 104ff.

15. Mahawar & Jaroli 2008, p. 10.

16. Meyer-Rochow & Chakravorty 2013.

17. Regarding the medical texts from Turfan, see Francke 1924a, 1924b, 1925, Hübotter 1928, Taube 1980, pp. 73ff. For medical texts from Dunhuang, see Yoeli-Tlalim 2013, 2015. A modern edition was edited by Luo 2002. The Turfan texts are in the data base *The International Dunhuang Project: The Silk Road Online* under the numbers: TibHT 1, TibHT 24, TibHT 25, TibHT 26. The same database has the Dunhuang texts under the numbers Pelliot tibétain 127, Pelliot tibétain 1044, Pelliot tibétain 1058, IOL Tib J 1246 (former number I.O. 56, 57) and IOL Tib J 756.

18. See Beckwith 1980, Yoeli-Tlalim 2013.

19. See Akasoy & Yoeli-Tlalim 2007.

20. This can be found in virtually all medical treatises. It was a standard procedure.

21. The *Four Tantras* consists of the *Root Tantra*, the *Explanatory Tantra*, the *Instructional Tantra* and the *Subsequent Tantra*.

Explanatory Tantra of his fundamental work, the *Four Tantras*.

22. Parfionovitch *et al.* 1992, pp. 75ff., 231ff.

23. *Shel gong shel phreng* 384/11, 390/17, 396/22, 400/18, 408/13, 410/16. For references, see appendix.

24. *Shel gong shel phreng* 382/11, 384/11, 385/6, 388/14, 390/15, 394/11, 400/18, 410/16, 413/21. For references, see appendix.

25. The information that Jampel Dorjé bears the monastic name Yeshé Döndrup Tenpé Gyemtsen can be found in the colophons of his works, *Mdzes mtshar mig rgyan A I* 347/3, *Mdzes mtshar mig rgyan B I*, p. 24 fol. 2 (47a/3), 347/3. In the latter, he states that he used a Chinese pharmacopeia (*bencao*) for the illustrations of his treatises, *Mdzes mtshar mig rgyan B I*, p. 24 fol. 1 (46b/2). It is obvious that he used one of the many versions of the *Bencao Gangmu*. There are several articles on his life and writings, see, for instance, Bao *et al.* 2004, Bao 2010. See also Hofer 2014 but note that she did not make full use of the colophons and did not consult the academic literature on Jampel Dorjé written by Chinese, Mongolian and Russian scholars.

26. The Tibetan designations are: 1. *khron gyis brko ba'i sde*, 2. *mchu yis brko ba'i sde*, 3. *ri dwags kyi sde*, 4. *gcan gzan gyi sde*, 5. *mthus za ba'i sde*, 6. *mi yis bdag byed pa'i sde*, 7. *khung du gnas pa'i sde* and 8. *rlan du gnas pa'i sde*.

27. rGyud bzhi 54/13.

28. These are: 1. The category of animals digging with their claws (*khron gyis rko ba'i sde*), 2. The category of animals digging with their beaks (*mchu yis rko ba'i sde*), 3. The category of herbivorous animals (*ri dwags sde*), 4. The category of large herbivorous animals (*ri dwags che ba'i sde*), 5. The category of carnivorous animals (*gcan gzan sde*), 6. The category of animals eating with force (*rtsal mthus za ba'i sde*), 7. The category of animals domesticated by men (*mi yis bdag byed sde*), 8. The category of animals living in dens and burrows (*khung gnas sde*) and 9. The category of animals living in water and damp locations (*rlan la gnas pa'i sde*).

29. In the opinion of Dash, both first categories of animals digging with their claws and animals digging with their beaks should be seen as a single category; Dash 1994-2001, vol. 3, pp. 50f.

30. gZhan la phan gter 394/2.

31. gSer gyi thur ma 74/17.

32. Srikantha Murthy 2004-2005 [1992-1997], vol. 1, pp. 83ff.

33. In the *Aṣṭāṅgahṛdaya-saṃhitā*, these eight categories are: 1. *mṛga* (*ri dwags*), 2. *viṣkira* (*khron rko*), 3. *pratuda* (*mchus rko*), 4. *bileśaya* (*khung na gnas*), 5. *prasaha* (*rtsal mthus za*), 6. *mahā-mṛga* (*ri dwags che*), 7. *apcara* (*chur gnas*), 8. *matsya* (*nya*) (the Tibetan equivalents have been copied from Tibetan translations of the *Aṣṭāṅgahṛdaya-saṃhitā*.) The designations can be interpreted and rendered in different ways depending on the animals that are grouped into a category. For instance, the standard translation for the term *mṛga* would be “a deer, an antelope”, but this would be an inaccurate rendering for the animals that are united in this group. Zimmermann therefore chooses the translation “quadruped” and “quadruped game” as the only acceptable rendering for *mṛga*, as it is the only umbrella term fitting for all animals equally, Zimmermann [1982] 1999, p. 60.

34. Zimmermann [1982] 1999, pp. 100, 103 etc., Olivelle [2002] 2011, pp. 377f.

35. *ka la nta ni / shin tu ltas bzang gi dus su 'babs pa'i bye'u ste / lus che ba dang kha dog snga lnga'i sgro spu shin tu mdzes pa / skad snyan pas rna can 'phrog pa dang / lding na bya byi'u thams cad rjes su 'brangs pa yin te / shel gong las / de pho phug ron ka lanta ka'i mgos / ro tsa rem la rma gso rdzas 'gar mchog / ces so / skad snyan pa'i bye'u phug ron 'dra la ljang gu ka la pingga dang ma nor ba dgos so, mDzes mtshar mig rgyan A I 223/1.*

36. This also has the name *Kalandaka*. Dave identifies it as chestnut-bellied nuthatch (*Sitta castanea*) and subspecies, Dave [1985] 2005, pp. 26, 487.

37. This meaning mainly applies in Buddhist literature. It can also be used as a generic term for sparrow-like birds with a sweet voice, Dave 2005, pp. 94f.

38. The broad medicinal use of honey in the Tibetan medical tradition deserves a separate study. It will therefore not be discussed in this article. For references regarding its identification, see appendix.

39. In this regard, one has to note that both Western and Tibetan authors usually are simplifying nosological categories by equating Tibetan disorders with Western diseases. For instance, if a certain plant is, according to Tibetan medicine, said to cure “liver diseases”, one usually finds the literal “translation” of liver diseases as it is understood in Western medicine, even though both entail differences in detail. The symptoms and classifications of diseases according to Tibetan medicine do not correspond to Western biomedicine and would be insufficient for a valid diagnosis from a Western perspective. In other words, a diagnosis made by a Tibetan doctor is not necessarily identical with a diagnosis made by a Western doctor and, for instance, a patient with a “liver disease” in Tibetan medicine could completely differently diagnosed in Western medicine. This important problem is often not adequately addressed in research. For a notable

exception see, for instance, Kletter & Kriechbaum 2001. In this article, diseases will therefore be put in quotation marks.

40. I have chosen these insects because they are mentioned in various Tibetan medicinal sources and in Tibetan texts on *materia medica*. It is possible that there are a few more I did not come across.

41. *sha sbrang mig po che bubs gcig, Bye ba ring bsrel* 374/9.

42. *mGul rgyan* 754/12, *'Chi med nor bu'i phreng ba* 76/2, *Man ngag snying gi nor bu* 131/4.

43. *Zin tig mdzes rgyan* 278/20.

44. *Bod rang skyong ljongs sman rtsis khang* 2005, p. 825.

45. For the reference, see the appendix.

46. Given the misspelled name *Eormica fusca* L., it seems that *rNam rgyal thar* 2006 and *dGra 'dul* 2009 simply copied *dGa' ba'i rdo rje* 1995.

47. *grog ma ni / raksha mig med / rgyu rgyur / gshin rje'i bu zer / mgo dang stod smad so sor chad cing nag po rkang drug khug nas byung ba'o / rgya gar du de'i khungs mkhar ba lhar [ltar] che bas gas pa 'dug mod / shel sgong las / raksha mig med rtsa 'byed dmu chu sbyong / zhes gsungs, mDzes mtshar mig rgyan A I* 257/1.

48. *raksha mig (grog ma yin) med rtsa 'byed dmu chu sbyong, Shel gong shel phreng* 422/15.

49. For more information, see Kletter & Kriechbaum 2001, p. 343.

50. *srog chags grog ma la spyir ming lnga 'dir raksha / mig med dang gnyis des rtsa kha 'byed la dmu chu sbyong, Vaiḍūrya sngon po* 340/3.

51. *de'i tshang gi sas sha skrangs 'joms, Vaiḍūrya sngon po* 340/4.

52. Srikantha Murthy 2004-2005 [1992-1997], vol. 2, p. 507. Cf. also Cakrapanidatta 1999, p. 244.

53. Parfionovitch *et al.* 1992, pp. 75f., 231f. Note that the painter mistakenly depicts the ant (or termite) with eight legs instead of six legs. In this regard, it resembles more a beetle than an ant. It is, however, correctly depicted in Jampel Dorjé's illustrated treatise showing this insect with six legs.

54. *raksha chur bsod srod la khyor gang btang / khams 'khrugs lus lci phrum ser khyer na yin, rGyud bzhi* 517/3.

55. *ru raksha drag po'i mig ces zur chag pa rag sha ste mig med lnga chur bsod pa'o, sKyem pa Tshe dbang 'Grel pa* vol. 3 519/16, *raksha ste drag po'i mig ces zur chag pa'i ru raksha lnga chur gdus pa srod la khyor gang btang bas khams 'khrugs zhes sems 'khrug cing lus po lci la phrum ser khyer zhes grang shum byed na dug yin, Vaiḍūrya sngon po* 1081/17.

56. *ru raksha drag po'i mig ces zur chag pa rag sha ste mig med lnga chur bsod pa la bshad na'ang / zhes bla rtas gsung [gsungs] kyang rang lugs ni srog chags grog ma la bzhed do, Mes po'i zhal lung sMad cha* 673/1; *raksha ni raksha mig med pa lnga chur gdu, mKhas pa'i zhal lung* 495/12; *raksha mig med pa lnga chur bsod, Phan bde'i sgo 'byed lde mig* 375/6. The term "eyeless demons" (*raksha mig med*) is normally understood as a term for ants. Although the interpretation *raksha* seeds without eyes is much less probable, the latter can serve as a quality attribute.

57. *Man ngag lhan thabs* 594/1, *Man ngag lhan thabs brda bkrol* 197/20.

58. *raksha ni ru raksha lnga zhes bai sngon dang srog chags grog ma lnga zhes bla rta ltar dka' 'grel lo, A ru ra'i phreng ba'i mdzes rgyan I* 408/9, *A ru ra'i phreng ba'i mdzes rgyan II* 473/7. He wrongly attributes the opinion that ants are meant to *Lata (Bla rta)*, i.e. *Kyempa Tsewang*.

59. *brag dkar (bya rgod sha) bdud rtsi brag (sbrul sha) 'og rtsi / chu yi (nya khyi ba) bdud rtsi rdo 'og (grog ma dmar po) rtsi / chu glang (sbal pa) brag gi glang bu (rtsangs pa) dang / shing kun de rnams phye ma ni / thor pa sod par byed pas byug, Zla ba'i rgyal po* 192/13.

60. *yang 'brum bcos kyi gsang sman ni / rang shi'i rkang mar 'brum lkog [skogs] gnyis la byed / la las srog chags grog ma drug bdun tsam re mar 'dril gyur [khyur] myid byed pa dang, Zhal shes snying gi khu ba* 382/15.

61. *chu 'dren gsang sman / raksha mig med [grog ma] sbyang shis cha drug la / sradd dkar skyu ru glang sna [lug ru dmar po] nyi dga'i 'bru / gur gum 'jib rtsi ba chu'i khanda rnams / thun re zhib btags sbrang*

rtsis ril bu ni / sran spos tsam dril lnga bdun chu tshan phul / tsha chu grang chu la sogs chu rigs kun / 'dren skem the tshom bral ba'i gsang sman yin, Man ngag rin chen 'byung gnas 94/2.

62. zho sbur la spyi dang 'dir ming gcig 'khrul med sbur chung des chu ser la phan, *Vaidūrya sngon po* 349/22.

63. Le 'dod mos 2009, p. 294. In modern usage the term “yellowish fluid” is often used to denote serum or lymph.

64. *rGyud bzhi* 339/11.

65. sbur ba ste zhod sbur, *Vaidūrya sngon po* 777/1.

66. zho sbur ni / sbur chung myur mgyogs can de'o, A ru ra'i phreng ba'i mdzes rgyan I 130/7, A ru ra'i phreng ba'i mdzes rgyan II 138/19.

67. zho sbur ni / dbyar du zho rnying ba nas grub pa'i 'bu zhig gam snyam mo / bai sngon las / zho sbur zhes pl sbur chung ni chu ser la phan par bshad, *mDzes mtshar mig rgyan A I* 256/2.

68. sbur pa se sbur ro, *sKyem pa Tshe dbang 'Grel pa* 265/16; sbur ba ni bse sbur, *mKhas pa'i zhal lung* 394/15.

69. sbru pa ni gser sbur nag po, *Phan bde'i sgo 'byed lde mig* 270/4.

70. For references, see the appendix.

71. spru ma'i 'bu ni / spru ba dkar nag gnyis / dkar po ste/ gdugs dkar can gyi 'bu'o, *rGyud bzhi'i rtsa 'grel* 186/4

72. spru ma'i 'bu khra bo de yi rma yi khrag shor ba sdom mo, *sKyem pa Tshe dbang 'Grel pa* 444/3.

73. spru dkar gyi dkyil du gnas shing 'tsho ba'i 'bu khra bo, *Dri med kun gsal* 105/10.

74. spru ma la rigs dkar nag gnyis su phye ba 'di dkar po de'i rtsa ba'am gseb tu gnas pa'i 'bu khra bo che chung mthe bong tsam pa de yis ni, *Gser mchan* 843/13.

75. spru ma'i 'bu ni spru dkar gyi rtsa bar ston dus 'bu sngo khra yod pa de yin, *mKhas pa'i zhal lung* 282/19. See also *Drang srong zhal lung vol. 1* 564/21.

76. spru ma'i 'bu ni / spru dkar 'bu / shu ta dye pa zer / spru dkar gyi lo mar yod pa'i 'bu ste / rgyud las / spru ma'i 'bu yis rtsa khrag shor ba sdom zhes gsungs / so, *Mdzes mtshar mig rgyan A I* 256/1.

77. For references, see the appendix.

78. Yonten Gonpo 2011a, p. 217.

79. spru ma'i 'bu yis rtsa khrag shor ba sdom, *rGyud bzhi* 75/12. Clark 1995, p. 117, Yonten Gonpo 2011a, p. 217.

80. spru ma'i 'bu la spyi dang 'dir ming gcig / de yis rtsa'i khrag shor ba khong nas sdom, *Vaidūrya sngon po* 322/7.

81. spru ma dag la rnam pa gnyis, *Vaidūrya sngon po* 328/18, shu ti zhes pa 'u su nag por bzhed na'ang spru 'bru, *Vaidūrya sngon po* 700/15, shu ti zhes spru ma'i 'bru, *Vaidūrya sngon po* 798/2.

82. spru ma'i 'bru yis rtsa khrag gcod, 'Bum bzhi vol. 1 249/16

83. spru 'bu bcos nas spru 'bru byas nor, *Kun gsal snang mdzod* 840/4.

84. spru ma, *Shel gong shel phreng* 271/8, sbur khras khyi dug spru 'bus khrag shor sdom, *Shel gong shel phreng* 420/14.

85. phye ma leb ni / stag khra / bye stag khra / bye stag / lhung byed zer / me 'od la chags nas bsags pa kha dog sna tshogs yod pa'ang dgos pa ser khra lus phra chung 'dab bzhi pa mdog bris pa ltar shin tu rnon po'o / shel gong las phye leb ser khras so srin nywa log sel / zhes so, *Mdzes mtshar mig rgyan A I* 256/3.

86. For references, see the appendix.

87. Phan bde'i sgo 'byed lde mig 248/14, 275/1, *sKyem pa Tshe dbang 'Grel pa* 232/11, 274/10, Mes po'i zhal lung sMad cha 326/3, 390/21, *Vaidūrya sngon po* 706/18, 788/3, *mKhas pa'i zhal lung* 377/8, 398/3, A ru ra'i phreng ba'i mdzes rgyan I 245/6, 281/12, *Drang srong zhal lung vol. 2* 705/11, vol. 3 144/14.

88. bye stag la spyi dang 'dir ming gcig / de'ang phye ma leb ser khra'i shas so srin dang / nywa log la phan, *Vaidūrya sngon po* 349/21.

89. *Shel gong shel phreng* 421/20.

90. Le 'dod mos 2009, p. 1117. Today the tiny beings known as *sin* (*srin*) are often interpreted as bacteria and viruses. They are also regarded as worms or parasites.
91. Le 'dod mos 2009, p. 339.
92. *de ma 'dzom na cha ga ni rigs che chung kha dog gi dbye ba mang yang nus pa mtshungs, sKyem pa Tshe dbang 'Grel pa* vol. 3 295/1.
93. *cha ga ba ni lte chag gam / tshag tshag pa'am / lte ba san cag gam / seng phrug gnam 'phyogs zhes pa, Bdud rtsi sgron me* 278/7, *cha ga pa ste lte ba ca cag / seng phrug gnam mchong bong, sKyem pa Tshe dbang 'Grel pa* vol. 2 535/12, *mi cha gdab / lte cag pa / chag chag pa / seng phrug gnam mchings / zhes sogs so, sKyem pa Tshe dbang 'Grel pa* vol. 3 295/1, *cha ga pa ste lte ba cag cag / seng phrug gnam 'tshong ('chong), Mes po'i zhal lung sMad cha* 683/11, *cha ga pa zhes pa'am / re lcag pa / te ba phan cag seng 'brug gnam mchong / tshag tshag pa sogs su grags pa, Mes po'i zhal lung sMad cha* 971/1, *cha ga ni cha ga pa ste pa pan cag / seng 'phrug gnam 'phyong / yul skad du tshar tsha' zer, A ru ra'i phreng ba'i mdzes rgyan I* 488/6, *de ma 'dzom na cha ga pa zhes sam seng phrug gnam mchong tshag tshag pa sogs su grags pa, Drang srong zhal lung* 315/1, *de ma 'dzom na cha ga'i mgo zhes cha ga ni tshags pa rkang dmar zer ba skad rtsub pa man rgyud rma'i skabs su khyung phrug skyugs pa'i kha chu zer ba de mar khu skyugs pa phyi rgyud rtsa'i byid po'i skad ltar thung la rtsub pa 'phar zhes byid po ni 'di dngos yin par mkhyen gzigs nas gsungs, mKhas pa'i zhal lung* 676/5.
94. *cha ga pa la spyir ming lnga 'dir gcig de ni ston ka spang du 'ong ba de phur ba'i kha chu bdud rtsi smug po zhes pas klad pa 'dzag pa gcod cing rtsa nad 'jam par sbyong, Vaiḍūrya sngon po* 345/5, *cha ga pa zhes sam te ba ban cag seng 'brug gnam mchong / tshag tshag pa sogs su grags pa'i mgo bo bsdeb pa dang, Vaiḍūrya sngon po* 1337/1.
95. *cha ga pa ni / cha ga pa zer / mtho bong tsam yang ring / skya smug nag thig can 'dab ma dmar po lding na sgra 'byin zhing rkang drug gi phyi ma ring ba dang de'i kha chu la bdud rtsi smug po zer / rgya nag tu shin tu mang pos lo thog za ba'ang 'dug / shel sgong las / chu sbur bshad de / de bzhin cha ga'i mgo yis byang dug 'joms / bdud rtsi smug pos klad pa 'dzags pa gcod / zhes gsungs so, Mdzes mtshar mig rgyan A I* 263/1.
96. For references, see the appendix.
97. *rGyud bzhi* 532/2.
98. *rGyud bzhi* 624/2. Dašiev 2001, pp. 617ff, Yonten Gonpo 2011b, pp. 193ff.
99. *rGyud bzhi* 624/17. See also *rGyud chung* 818/2.
100. *Bye ba ring bsrel* 274/10.
101. *Dug srung rim pa* 470/8.
102. For references, see the appendix.
103. *lte mkhrang nad la gla rtsi byi tang ga / ma ru tse dang smyug rtsi pi pi ling / phur thal sdig srin dri chus sbyangs la btang / zi ldi sbur thal pha ma'i skra gzhob bzhi / byis pa'i chur sbyangs btang bas sel bar 'gyur, rGyud bzhi* 371/4.
104. *zi ldi ni zi ldi ra sbur pa chen phur shes mchu [chu?] dug 'byung ba de'o / sbur pa ni bse dri can no / 'di gnyis nus bsreg byas pha dang ma gnyis ka'i skra gzhob dgos so, sKyem pa Tshe dbang 'Grel pa* 297/17.
105. *zin [zi] ldi zhes pa zi de ra sbur ba chen po phur shas chu dug 'byung ba de'o / sbur ba zes pa ni gseb dri can no / 'di gnyis nus ldan du bsregs byas pho dang mo gnyis ka'i skra bzhob [gzhob] dgos so, Mes po'i zhal lung sMad cha* 427/9.
106. *zi ldi ra la spyi dang 'dir ming gcig de'ang ngo bo che la lo bzhi dbyar du dbyar nyi ldog nad 'byung ba de dang / chung ba nam du 'byung ba des rang gi chu nad dang gnyan rigs byis pa'i lte mkhrang la phan, Vaiḍūrya sngon po* 345/2.
107. *yang na zi ldir dang sbur ba gnyis nus ldan bsregs thal dang phru gu'i pha ma'i skra gzhob bzhi byis pa'i dri chur sbyangs la btang bas sel bar 'gyur, Vaiḍūrya sngon po* 826/6.
108. *zi ldi ni dbyar nyi ldog dus byung ba'i sbur ba chen po ser nag 'phur shes pa de nyid chu nang du song na chu dug 'byung ba ming ldang gog lding gog gam zi di [ldi] ra zer ba de'o // sbur ni sbur pa nag po bse dri can de'o // thal ni nus ldan bsreg / lte rnag dang po la bu rang gi lte ba bcad pa skam po'i phye ma gdab, Phan bde'i sgo 'byed lde mig* 287/16.

109. zi ldi ni zi ltir ste / bee sngon las / ngo bo che la lo bzhi bar du dbyar nyi ldog nad byung ba de dang chung ba nam du'ang 'byung zhes bshad la / zi ldi spur thal zhes pa'i thad kyis dka' 'grel las / zi ldi zhes pa zin dir sbur ba chen po phur shes chu dug byung ba de'o / sbur ba zhes pa ni gsi pa dri can no / 'di gnyis nus ldan bsregs zhes bshad do, A ru ra'i phreng ba'i mdzes rgyan I 128/18, A ru ra'i phreng ba'i mdzes rgyan II 137/8.

110. zi ldi ni zin [zi] ldir te / sbur ba chen po rwa can phur [phur] shes chu dug can gyi sar byung / sbur ba ni bse dri mnam pa'i sbur ba, A ru ra'i phreng ba'i mdzes rgyan I 294/16, A ru ra'i phreng ba'i mdzes rgyan II 349/17.

111. zi ldir ni / gser rgyan las / zil [zi] der [ldir] spur [sbur] ba chen po 'phur shes chu dug las byung ba de'o / zhes dang bai sngon las / ngo bo che la lo bzhi dbyar dus dbyar nyi ldog nang 'byung ba dang / chung ba nam du yang 'byung ba des rang gi chu nang dang gnyan rigs byis pa'i lte mkhrang la phan bshad / de yang che ba 'phur na sgra cir car bsgrogs te / rgya ser smug che chung bse spur [sbur] tsam shing la yod / chung du rgyab gser 'dra ba mthe chung sen tsam bye mar mang po 'phur yod, Mdzes mtshar mig rgyan A I 255/1, Mdzes mtshar mig rgyan A II 241/9

112. zi ldi ra ni khyi spos pa dang / sbur ni bse sbur gnyis nus bsregs thal / rnag tu khug na phug pa sa 'tsho bar 'gyur/ zhes shes par bya, mKhas pa'i zhal lung 408/18.

113. bse sbur ni / sbur ba nag po'o, rGyud bzhi'i rtsa 'grel 186/2, bse sbur ni nag gseb dri can te / sbu lam pa zhes kyang bya'o, sKyem pa Tshe dbang 'Grel pa 443/23, bse mo sbur gog dang bying bying thu lu gnyis kyis srin glang 'thab drag po'i nad 'joms par byed, Dri med kun gsal 105/8, bse dri mnam pa'i sbur ba, Vaidūrya sngon po 322/2, bse sbur zhes bse dri mnam pa'i sbur ba de dang, Don gsal nyin byed 439/16, bse sbur ni sbur nag bse dri can dang, Drang srong zhal lung vol. 1 564/18.

114. bse sbur ni nag po rgyab ser zhad can dru dug pa, Si tu sMan ngo gsal byed 115/2, bse sbur ni nag po rgyab ser zhad can dri shin tu dugs pa, mKhas pa'i zhal lung 282/17.

115. bse sbur ni sbur ba dri ma can nam bse dri sbur gog ces pa de'o / 'di la rigs ni che 'bring chung gsum 'byung ngo / kha cig ni so ka'i dus su nyin sa 'og tu mi mngon par sdod cing srod dus bar snang dang shing rtser lding ba'i ming zi ldir ba zhes che chung gnyis yong ba de la bzhed / kha cig ni sa yi g.yag rgod stobs che'am ming gzhan ka go [ko] g.yag ces pa che chung gnyis yong ba de la bzhed cing / de dag rnams kyang mi 'thad pa ni ma yin te / ro nus sogs mtshungs pas so / ngo bo ni sngar bshad pa de dang, gSer mchan 843/4.

116. bse sbur ni / spur rog po zer / bai sngon du drin mnam pa'i spur ba zhes pa nag srab mthe bong tsam rkang drug pa / 'og sgo nas bse dri 'dra byung ba de'o / rgyud las / bse spur bying bying thu lus glang thabs 'joms zhes so, mDzes mtshar mig rgyan A I 255/3.

117. There is some disagreement regarding what *sebur* is. One author indicates that it refers to beetles of the *Blaps* genus. Another states that it is a species of dung beetle. Parfionovitch *et al.* 1992 gives a slightly confusing statement by saying that it refers to beetles (Coleoptera), but then adds stink bugs. Indeed, many scholars consider *sebur* to be *Nezara viridula*, a plant-feeding stink bug. This also applies to Luo 1997, but he provides a further possible identification, which is a certain species of dung beetle. Clark 1995 differs significantly by providing three potential identifications, namely the oriental cockroach, the American cockroach, or a species of dung beetle. For references, see appendix.

118. Zla ba'i rgyal po 168/3.

119. bse sbur bying bying thu lus glang thabs 'joms, rGyud bzhi 75/11.

120. Kletter & Kriechbaum 2001, p. 347, Semichov 1981.

121. Bye ba ring bsrel 106/11, 417/13, Man ngag rin chen 'byung gnas 593/12.

122. Bye ba ring bsrel 106/11, 'Bum khu tshur 365/19, Man ngag rin chen 'byung gnas 248/6, 593/12, 597/10.

123. bse sbur ni nag gseb dri can te / sbu lam pa zhes kyang bya'o / bying bying thu lu ni rdzib ci zho la zhes kyang bya ste / sbur khog dri can rgyab yol yod pa lta bu'o / nus pa ni gnyan srin gyis skyed pa'i glang thabs 'joms so, sKyem pa Tshe dbang 'Grel pa 443/23. See also the statement made by Sönam Yeshé Gyentsen, where he writes that it cures "colics" caused by disturbance of internal "small

animals”, bse mo sbur gog dang bying bying thu lu gnyis kyis srin glang 'thab drag po'i nad 'joms par byed, *Dri med kun gsal* 105/8.

124. Kletter & Kriechbaum 2001, p. 349.

125. zi ldi spur thal pha ma'i skra gzhob bzhi / byis pa'i chur sbyangs btang bas sel bar 'gyur, *rGyud bzhi* 371/5.

126. yang na zi ldir dang sbur ba gnyis nus ldan bsregs thal dang phru gu'i pha ma'i skra gzhob bzhi byis pa'i dri 826/6, bse sbur, *Vaidūrya sngon po* 1393/18.

127. bse sbur zhes pa bse dri mnan pa'i sbur gyis gnyan tshad sel zhing byis pa'i lte mkhrang la phan / bying bying thu lus chu 'gags 'bigs shing / yang 'di dang bse sbur gnyis kyis glang thabs 'joms, *Shel dkar me long* 222/16.

128. bying bying thu lu ni / 'ga' zhiig sbrang bur 'dod pa dang / 'ga' zhiig dmar nag rkyal ba la 'dod pa sogs byung yang / zi ldi ra ba'o, *rGyud bzhi'i rtsa 'grel* 186/2.

129. bying bying thu lu ni rdzib ci zho la zhes kyang bya ste / sbur khog dri can rgyab yol yod pa lta bu'o, *sKyem pa Tshe dbang 'Grel pa* 444/1.

130. bying bying thu lu ste ming gshog mo rdza log ces pa gshog pa'i rnam pa can yod med gnyis yong ba de gnyis kyis srin glang thabs kyi rigs rnams 'joms so, *gSer mchan* 843/11.

131. bying bying thu lu ni 'bu mjug ma ra gnyis yod pa'i rgyab gnyer ma can leb mo de yin, *Si tu sMan ngo gsal byed* 115/3.

132. bying bying thu lu ni 'bu mjug la rwa gnyis yod pa'i rgyab gnyer ma can leb mo de yin, *mKhas pa'i zhal lung* 282/18, bying bying thu lu ni 'bu mjug mar ra gnyis yod pa rgyab gnyer ma can de, *Drang srong zhal lung vol. 1* 564/19.

133. bying bying thu lu ni / rdzib rdzib / zhol spur ba zer / bse 'bur nas che sgor mo rkang drug 'dab ma can / lding nus pa mi 'brun ril mor byas nas khung du khyer ba de yin nus pa gong ma dang mtshungs, *mDzes mtshar mig rgyan A I* 255/4.

134. For references, see appendix.

135. bse sbur bying bying thu lus glang thabs 'joms, *rGyud bzhi* 75/11.

136. Zla ba'i rgyal po 167/17.

137. Man ngag rin chen 'byung gnas 248/7.

138. *rGyud bzhi* 329/4.

139. sdig srin chu sbur gnyis kyis chu 'gags sel, *rGyud bzhi* 75/11.

140. *Shel gong shel phreng* 421/5.

141. sbur mgyogs ni chu nang du myur du rgyud pa'i sbur chung nag po ste chu sbur zhes so, *bDud rtsi sgron me* 278/6, chu sbur ni chu la gnas pa'i sbur pa skad cig kha gting du rgyu nus pa ste sbur mgyogs zhes pa de'o / 'di gnyis kyi nus pa ni chu 'gags pa 'byin no, *sKyem pa Tshe dbang 'Grel pa* 443/21, chu sbur ni sbur mgyogs kyang zer / chu'i dkyil du gnas pa'i sbur chung de nyid yin / de gsum kas dri chu 'gags pa sel bar byed, *Dri med kun gsal* 105/6, sdig srin la spyir ming dgu 'dir gcig tu 'dod pa dang / chu nang gi sbur ba myur bar 'gro ba'i sbur chung la spyi dang 'dir ming gcig de gnyis kyis chu 'gags pa sel zhing chu sbur gyis khyad par du rtsa nad 'jam por sbyong, *Vaidūrya sngon po* 322/1, chu sbur ni chu bar nas shin tu mgyogs par rgyug pa'i 'bu chung ngu nag po sre nyams can de yin, *Si tu sMan ngo gsal byed* 115/2, sdig srin dang chu sbur zhes pa chu nang du myur bar 'gro ba'i sbur chung gnyis kyis chu 'gags sel zhing / chu sbur rgyis rtsa nad 'jam por sbyong, *Shel dkar me long* 222/15, chu sbur ni chu yi ba shin tu mgyogs par rgyug pa'i 'bu chung ngu nag po sre nyams can de yin, *mKhas pa'i zhal lung* 282/15.

142. chu sbur ni / ljon mo myur mgyogs rta zer / bai sngon las / chu nang du myur bar 'gro ba'i sbur chung zhes pa char chu las grub cing rgas na sbal chung 'gyur te / der tshe gcig lus gnyis dang / sbal ba mjug ma can zer / de phyis sbal bar 'gyur ro / rgyud las / sdig srin chu sbur gnyis kyis chu 'gags sel / zhes gsungs so, *mDzes mtshar mig rgyan A I* 262/2.

143. The Mongolian term is *qoruqai sinayan*, the Manchu is *koki*, and the Chinese is *kēdōu* (蜣螂).

144. One scholar gives a family of water beetles. Others are more specific and identify it as *Cybister tripunctatus orientalis* Gschwendtner, which is a synonym for *Cybister tripunctatus lateralis* Fabricius, thus a genus within this family. For references, see appendix.

145. rGyud bzhi 543/13.
146. chu sbur gyis khyad par du rtsa nad 'jam por sbyong, Vaidūrya sngon po 322/2.
147. Man ngag rin chen 'byung gnas 128/8, 611/7.
148. For references, see appendix.
149. ming gzhan padme zhes so, bDud rtsi sgron me 276/12, ming gzhan pad me'u dang rgya nag me lce 'khor lo / rgya grog dmar po zer ba'ang snang, sKyem pa Tshe dbang 'Grel pa 443/6, ming ni padme stag chung / dmar khra byang khra padma [padme] can dang / hor gdan ser po sogs so, gSer mchan 842/14, byang pa ni / brang ha la / stag chung dmar khra / mo nad dpa' bo zer, Mdzes mtshar mig rgyan A I 262/1.
150. Zin thig yang thig 502/14, rGyud bzhi'i rtsa 'grel 186/1, bDud rtsi sgron me 276/12, sKyem pa Tshe dbang 'Grel pa 443/6, Dri med kun gsal 104/17, gSer mchan 842/14, mDzes mtshar mig rgyan A I 262/1.
151. byang ba nag khra kun la dug yod pas spang ngo, 'Bum khu tshur 289/11, rigs ni nag dmar ser po khra / rim par sngar bzang cher rje'i lugs / kho bo'i nyams len 'di rang ngo / zla ba thigs par nag khra chug [chung] / dug yod pa ni spang ngo zer / dmar khra snyoms la ser khra brdul [rtul], Zin thig yang thig 502/14.
152. nag po gsum dang dmar khra bdun mnyam / dmar khra bdun dang ser khra bcu gcig mnyam pas bzang ngan gyi nus pa khyad par de dang bstun pas, Dri med kun gsal 104/17.
153. Zin thig yang thig 502/19, 'Bum khu tshur 289/11, rGyud bzhi 624/16, Yid bzhin nor bu 96/17, Bye ba ring bsrel 121/11, Bye ba ring bsrel 426/15.
154. la la mgo lag 'dreg ['breg] zer te / mgo lag med na gang med kyi / nad mi 'grangs ['drongs] pas mi 'dreg ['breg] go, Zin thig yang thig 502/20.
155. byang pa mgo rkang chad na nad 'drongs chung, rGyud bzhi 624/17.
156. dmar khra bar gshog ldan pa nyi shu gcig / gshog dkar phral na rno myur ga la srid, Bye ba ring bsrel 121/11.
157. rje g.yu thog pa'i shog dril skor gsum las sbyong gi sde tshan skor du / sug smel gyis pho ba'i gzhi 'dzin / gur gum gyis mchin pa skyob / shri khandas bungs che zhing gnyug ring du 'khru / dong ga'i 'khor los 'khor zhing 'khru / dan das rgyug / sngon bus 'khrog dug phyid [byid] dpa' bo stobs dang ldan / rgya tshas 'bigs / byangs bas 'ded / sdig srin nad rnams rtsa lam 'khril / bye mas gnon / thang chus (attached note: dkar po) rtsa lam 'byed / bul tog gis na tsha med, Phan bde'i bang mdzod 252/12.
158. It is likely that the "wheel of iron" is the secret name of an ingredient. As a note is not attached, it remains unresolved what kind of *materia medica* it is.
159. shig khra gshog bor rnam pa (note: byang khra) bdun / sbur 'gyogs (note: ser po) gcig gi rta la bskyon / lcags kyi 'khor lo phyag na bsname / dung gi (note: rgya tshwa) / ber ga gser gyi (note: gsar bye ma) zhwa / zhib btags chang gis cung pos phul, gSer bre chen mo II 209/13.
160. Zla ba'i rgyal po 232/12.
161. gSung sgras 19/1.
162. Zin thig yang thig 501/1.
163. For these and the following schools, see Desi Sangyé Gyatso 2010.
164. gSer bre chen mo I 297/2, gSer bre chen mo II 209/13, dNgul bre ma 174/1.
165. Yid bzhin nor bu 96/7, Bye ba ring bsrel 110/6, 121/7, 195/10.
166. bDud rtsi'i thigs pa 484/4.
167. For a translation of Yönten Gönpö's treatment, see Dašiev 2001, pp. 617ff, Yonten Gonpo 2011b, pp. 193ff.
168. Zin thig yang thig 502/11.
169. rGyud bzhi 624/13, 'Bum khu tshur 289/8, Zin thig yang thig 502/11, Nyi ma'i snying po 916/12.
170. The *sema* plant belongs to various genera, mainly *Astragalus*, *Oxytropis*, and *Hedysarum*. The *kyiwa* plant belongs to the genus, *Sophora*. It is often identified as *Sophora moorcroftiana* (Benth.) Baker. For references, see appendix.
171. It seems that some authors identify this with *Isodon rubescens*, but most states that it is *Artemisia* species. For references, see appendix.

172. The only exception is a recent article by Sabernig. She provides quantitative data on the use of four animal products, namely musk, elephant's bezoar, bile of a bear and rhino horn, in the Tibetan drug lists of some modern authors, see Sabernig 2011.

173. A good example is the identification of the horse in Tibetan medicine. Some modern Tibetan authors regard the horse as *Equus caballus orientalis* Maack, following certain publications on Tibetan *materia medica* written by Chinese scholars, see for instance Luo 1997, p. 331. Maack is, however, the mistaken name for Noack, which can also be found in its correct form in a Chinese publication, Zhongguo kexue yuan xibei gaoyuan shengwu yanjiusuo 1991, p. 500. This identification, regardless of the correct or incorrect name's spelling, does not match any current taxonomic orders and is more or less exclusive to TCM; see, for instance, Yang 2003, p. 290, Liu *et al.* 2012, p. 212. This identification seems to be based on the idea expressed by the German zoologist, Theophil Noack (1840-1918), that the horse (*Equus caballus*) has three types: namely *E. orientalis*, *E. robustus*, and *E. przewalskii*. He states "Im Besonderen muß *Equus caballus* in die 3 Arten: *Equus orientalis*, das warmblütige, *Equus robustus*, das kaltblütige Pferd und *Equus Przewalskii*, den Pony aufgelöst werden" (Noack 1903, p. 373). It is currently unknown how exactly this notion found its way to describe a horse in TCM *materia medica* as an *Equus caballus orientalis* Noack. Today the wild horse (*Equus ferus*) is subdivided into the domestic horse (*Equus ferus caballus*), the Eurasian wild horse (*Equus ferus ferus*), and the Przewalski's horse (*Equus ferus przewalskii*). In Tibetan medicine, the domestic horse and its by-products are used for medicinal purposes, which should be properly identified in scholarly publications. In other words, one has to be cautious about the Western identification of Tibetan *materia medica* in modern publications.

174. See Eidmann 1941, Dlussky 1965, Bharti 2008, Thapa 2000, pp. 70ff., Pfeiffer *et al.* 2006, Bayartogtokh *et al.* 2014.

175. Narsu & Stuart 1988, p. 8, Ding *et al.* 1997, pp. 215f., He & Li 2003, Costa-Neto 2005, pp. 102f., Guo & Zhang 2011.

176. For example, Namba states that cicada nymph skin can be used for infantile convulsions, Namba *et al.* 1988, p. 253.

177. Zhang & Guo 2011, Zhang & Liu 2014.

178. *da ni rgya nag tong kun rgyal bo'i gdams pa*, *Bye ba ring bsrel* 374/6. On the term *tong kun*, see Van Schaik & Galambos 2012, pp. 170ff., Van Schaik 2013.

179. See, for instance, Namba *et al.* 1988, pp. 275, 277f., Ding *et al.* 1997, p. 213, Li *et al.* 2010, Mo & Wang 2013.

ABSTRACTS

The practice of using animals and their by-products has a long history in the Tibetan medical tradition. Such therapies also often include products deriving from insects, some of which will be discussed in the present paper. After a brief introduction addressing the importance of medicinal products deriving from animals and insects in the Chinese and Indian medical traditions, the systems used by Tibetan and Mongolian doctors to classify animals will be discussed. The medicinal use of eleven insects will be examined by textual analysis, with a particular focus on the traditional description of the animal and their healing potentials. This set of eleven insects includes flies, ants, two unidentified insects, butterflies, cicadas, and four kinds of beetles, such as diving beetles and blister beetles.

L'utilisation d'animaux et de leurs sous-produits a une longue histoire dans la tradition médicale tibétaine. De telles thérapies incluent aussi souvent des produits issus d'insectes dont certains seront présentés dans cet article. Après une brève introduction sur l'importance des médicaments issus des animaux et des insectes dans les traditions médicales chinoise et indienne, les systèmes utilisés par les médecins tibétains et mongols pour classer les animaux seront discutés. L'utilisation médicinale de onze insectes sera examinée au travers de l'analyse textuelle, avec un accent particulier mis sur la description traditionnelle de l'animal et de son potentiel thérapeutique. Cet ensemble de onze insectes comprend des mouches, des fourmis, deux insectes non identifiés, des papillons, des cigales et quatre types de coléoptères, tels que les dytiques et les cantharides.

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