Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/trq3a006
Review Article

Ethnoveterinary medicines used for mitigating goat diseases in Zimbabwe: A narrative review.

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Abstract
Livestock production, including goat farming, is important for rural development as it provides food security and fast-turnaround cash for the household. However, goats are often susceptible to various diseases and ailments. The current study was aimed at identifying and analysing medicinal plants used as ethnoveterinary medicines to treat and manage goat diseases and ailments in Zimbabwe. Ethnobotanical information on medicinal plants used to treat and manage goat diseases and ailments in Zimbabwe was systematically collected using relevant keywords from online databases such as Web of Science, Scopus, SpringerLink, PubMed, Google Scholar, Science Direct and Scielo. Additional information was also obtained from pre-electronic sources such as books, journal articles, dissertations, book chapters, theses, and other scientific articles obtained from the university library. A total of 76 medicinal plants belonging to 34 families are used to treat 62 goat diseases and ailments. Fabaceae (14 taxa), Asteraceae (six), Solanaceae (five), Apocynaceae and Rubiaceae (four taxa each), Anacardiaceae, Asparagaceae, Meliaceae and Pedaliaceae (three taxa each) were the most frequently used plant families. The most treated diseases are endoparasites (53.9%), diarrhoea and wounds (26.3% each), ecto–parasites and ticks (21.1% each), and tick-borne diseases (14.5%). Common plant parts used are roots (38.2%), leaves (30.3%), bark (21.2%) and whole plants (18.4%). Baseline data provided in this study about medicinal plants used to treat and manage goat diseases and ailments in Zimbabwe are important and of great value when evaluating the therapeutic potential and ethnopharmacological properties of medicinal plants. Such data can be used for future ethnopharmacological research focusing on chemical, pharmacological and toxicological evaluations of the documented species. Although documented taxa are not currently threatened with extinction, harvesting roots, bark, and whole plants as sources of traditional medicines is not sustainable and therefore not recommended.

Keywords: *Indigenous pharmacopeia, Materia medica, Traditional ecological knowledge, Zimbabwe*
Submitted: April 18, 2026 **Accepted:** May 30, 2026 **Published:** June 30, 2026

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Introduction
Goats are the third most populous ungulate livestock species globally (Kerven, 2024), with an estimated worldwide population exceeding one billion (FAOStats, 2026). Goats appear to be among the first farm animals to be domesticated with molecular data indicating that domestication of this ungulate happened during the Neolithic period, about 11000 years ago in south-western Asia, over an area located north of the Fertile Crescent and spanning across the Zagros Mountains of north-western Iran, the Caucasus and south-eastern Anatolia (Amills et al., 2017; Monteiro et al., 2018; Kaumbata et al., 2020; Hermes et al., 2020; Crepaldi et al., 2024; Kerven, 2024). Goats are particularly important in marginal and harsh environments and/or agroecosystems deemed unsuitable for crop production, as they thrive in extreme climatic and geographical conditions, including frigid, dry, hot, and semi-arid conditions (Lebbie, 2004; Kaumbata et al., 2020; Kerven, 2024). Due to their adaptability to different environmental and climatic conditions, goats are dispersed all over the world (Lohani and Bhandari, 2021; Mattiello et al., 2024), playing an important role in the provision of food and nutrition, income, nitrogen-rich manure and other uses (Kaumbata et al., 2020; Lohani and Bhandari, 2021; Kerven, 2024).

In Zimbabwe, for example, goats are the most exploited ruminant species in terms of food security, poverty alleviation, diverse cultural activities, contributing to the livelihoods of many rural communities through provision of meat, milk, skins, manure and readily sold, generating income for the household (Zvinorova et al., 2016; Mhlanga et al., 2018; Washaya and Chifamba, 2018; Munengwa et al., 2025; Nhovhoro et al., 2025). However, goats are often susceptible to various diseases and ailments, and smallholder farmers in rural communities rely on ethnoveterinary medicines as a sustainable alternative to

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Western veterinary practices. Ethnoveterinary medicines are often used to sustain livestock health through preventing and controlling diseases such as skin diseases, mild diarrhoea, sores, wounds and intestinal worms (McGaw and Eloff 2008; Jambwa and Nyahangare, 2020; Mazhangara et al., 2020). The current review, therefore, provides a critical appraisal of the trends and patterns of ethnoveterinary medicine usage against goat diseases and ailments in Zimbabwe. The review is aimed at identifying existing traditional ecological knowledge gaps that may serve as reference material for future research focusing on the therapeutic potentials of ethnoveterinary medicines.

Materials and methods

A literature search focusing on ethnoveterinary medicines used for treating and managing goat diseases in Zimbabwe was conducted from January to April 2026. Comprehensive data were systematically compiled in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Figure 1). This information was retrieved from different online databases such as ScienceDirect (https://www.sciencedirect.com/search), Google Scholar (https://scholar.google.com/), SpringerLink (https://link.springer.com/), PubMed (https://pubmed.ncbi.nlm.nih.gov/), Web of Science (https://www.webofknowledge.com), Scopus (http://www.scopus.com/) and SciELO (https://search.scielo.org/). In addition to this, pre-electronic sources such as books, journal articles, dissertations, book chapters, theses, and other scientific articles obtained from the university library were used. The search covered publications from 1976 to 2026, a long period to capture literature on medicinal plants used as ethnoveterinary medicines used for treating and managing goat diseases and ailments in Zimbabwe; see Table 1.

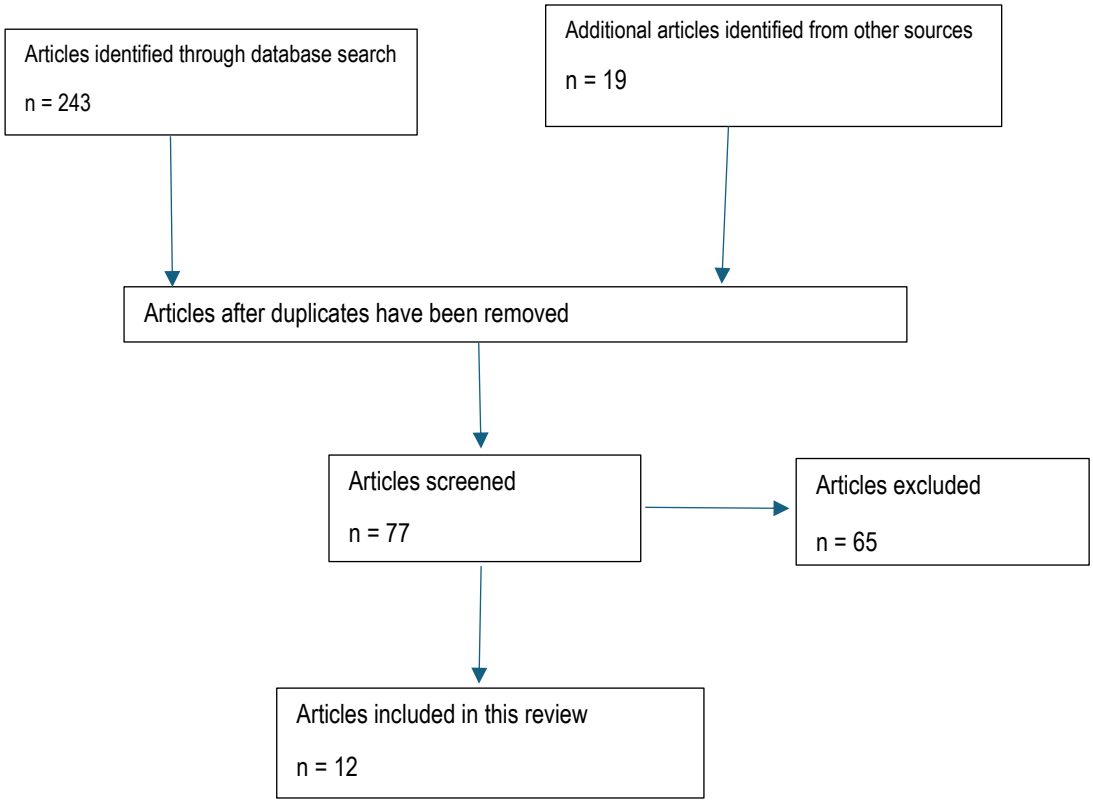

Figure 1: Flow diagram showing identification and screening of articles used in this review

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Table 1: Overview of literature sources documenting medicinal plants used to treat and manage goat diseases and ailments

Author(s) and year of publication	Focus of the study	Floristic regions where the study was undertaken
Chavhunduka, 1976	Documented medicinal plants used to treat and manage animal (including goat) diseases and ailments	NWCES
Gelfand et al., 1985	Documented indigenous and exotic plants used to treat and manage human and animal (including goat) diseases and ailments	NWCES
Madzimure et al., 2011	Evaluated acaricidal properties of medicinal plants against livestock (including goat) ticks	C
Maroyi, 2012	Documented medicinal plants used to treat and manage livestock (including goat) diseases and ailments	C
Nyahangare et al., 2012	Documented medicinal plants used against livestock (including goat) ticks	C
Nyahangare et al., 2015	Documented medicinal plants used against livestock (including goat) ticks	NWCS
Nyahangare et al., 2017	Documented medicinal plants used against livestock (including goat) ticks	C
Marandure, 2016	Documented indigenous and exotic plants used to treat and manage human and animal (including goat) diseases and ailments	NWCES
Jambwa and Nyahangare, 2020	Documented indigenous and exotic plants used to treat and manage human and animal (including goat) diseases and ailments	NWCES
Ncube et al., 2022	Documented medicinal plants used to treat and manage human and animal (including goat) diseases and ailments	W
Munengwa et al., 2025	Documented indigenous and exotic plants used to treat and manage goat diseases and ailments	CS
Munengwa et al., 2026	Evaluated anthelmintic activities of medicinal plants used to treat and manage goat diseases and ailments	CS

The literature studies (Chavhunduka, 1976; Gelfand et al., 1985; Madzimure et al., 2011; Maroyi, 2012; Nyahangare et al., 2012, 2015, 2017; Marandure, 2016; Jambwa and Nyahangare, 2020; Ncube et al., 2022; Munengwa et al., 2025, 2026) were used as the main sources of data for the analyses in this article, see Table 1. Literature sources excluded from this review are those articles that are partially accessed, that is, accessed as abstracts only, and also published articles lacking information on medicinal plants used as ethnoveterinary medicines for treating and managing goat diseases and ailments in Zimbabwe. From each article, the following information was collected: scientific, common, and family names of the medicinal plant species used, its habit, plant part(s) used, and ethnoveterinary uses or applications. The scientific names of all documented medicinal plant species from original data sources were updated to recently accepted plant names, according to the Plants of the World Online website (POWO, 2026) and the Flora of Zimbabwe database (Hyde et al., 2026), while nomenclature of the documented plant families follows Angiosperm Phylogeny Group (2016) and Christenhusz and Byng (2016). The distribution of medicinal plants used as ethnoveterinary medicines for treating and managing goat diseases in Zimbabwe follows Pope and Pope (1998), that is, Northern, Western, Central, Eastern and Southern (see Figure 2).

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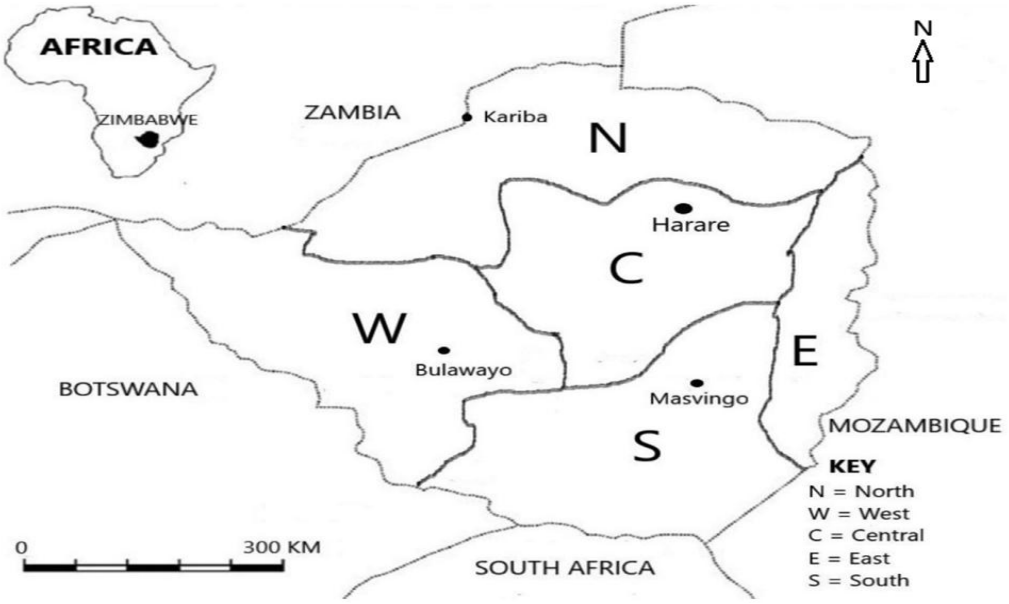

Figure 2: Map of Zimbabwe showing five floristic regions of Zimbabwe (modified from Maroyi, 2026)

Discussion

Medicinal plant diversity and use patterns

This study recorded 76 taxa that are traditionally used to treat and manage goat diseases and ailments in Zimbabwe (Table 2). Of these, 66 taxa are indigenous to Zimbabwe (86.8%), while 10 taxa are exotic (13.2.0%), either naturalized as weeds, tolerated or cultivated in agricultural fields and/or home gardens as crops, food plants and/or ornamentals. Such exotic plant species include *Aloe vera* (L.) Burm.f., *Bidens pilosa* L., *Capsicum annuum* L., *Catharanthus roseus* (L.) G.Don, *Datura stramonium* L., *Melia azedarach* L., *Nicotiana tabacum* L., *Opuntia ficus-indica* (L.) Mill., *Ricinus communis* L. and *Solanum lycopersicum* L. (Table 2). These exotic species are now considered to be an important component of the indigenous or traditional pharmacopoeia in Zimbabwe (Maroyi, 2017, 2018) as the species are widely used in the country to treat and manage human and animal diseases (Gelfand et al., 1985; Maroyi, 2017, 2018).

The majority of the documented medicinal plant species are eudicotyledons (89.5%, n = 68) and 10.5% (n = 8) are monocotyledons. Three-quarters of the taxa recorded in this study (75%; n = 57) are from 15 families (Table 3). The other 19 families are represented by one species each. Plant families with the highest number of taxa are Fabaceae (14), Asteraceae (six), Solanaceae (five), Apocynaceae and Rubiaceae (four taxa each), Anacardiaceae, Asparagaceae, Meliaceae and Pedaliaceae (three taxa each), Amaryllidaceae, Apiaceae, Combretaceae, Euphorbiaceae, Lamiaceae and Moraceae (two taxa each) (Table 3). The prominence of members of these families as sources of ethnoveterinary medicines used against goat diseases is not surprising, as Fabaceae, Asteraceae, Rubiaceae, Malvaceae, Apocynaceae, Euphorbiaceae, Lamiaceae, Acanthaceae, Poaceae and Asparagaceae are the dominant medicinal families in Southern Africa (Van Wyk, 2020; Cornelius and Van Wyk, 2024). The dominance of these families is consistent with patterns reported in previous ethnobotanical surveys focusing on utilization of medicinal plants as sources of ethnoveterinary medicines in Zimbabwe (Maroyi, 2012, 2023; Jambwa and Nyahangare, 2020; Munengwa et al., 2025). Major genera recorded in this study include *Asparagus* Tourn. ex L., *Aspilia* Thouars., *Ficus* Tourn. ex L., *Lannea* A.Rich., *Pterocarpus* Jacq., *Sesasum* L. *and Solanum* L. with 2 species each (Table 2).

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Table 2a: Medicinal plants used as ethnoveterinary medicines against goat diseases and ailments in Zimbabwe

Scientific name and family	Common name	Habit	Plant part used	Disease or ailment	Reference
**Aloe vera* (L.) Burm.f., Asphodelaceae	Aloe vera	Herb	Whole plant	Ectoparasites, gut worms, stomach disorders and wounds	Nyahangare et al., 2015; Munengwa et al., 2025
Annona senegalensis Pers., Annonaceae	Wild custard-apple	Shrub	Roots	Abortion, diarrhoea, foot and mouth, internal wounds, retained placenta and urinary problems.	Jambwa and Nyahangare, 2020; Munengwa et al., 2025
Asparagus africanus Lam., Asparagaceae	Bush asparagus	Climber	Whole plant	Abscesses, endoparasites, inflammation, stomach problems and wounds	Munengwa et al., 2025
A. laricinus Burch., Asparagaceae	Cluster-leaf asparagus	Climber	Whole plant	Endoparasites and reproductive disorders	Munengwa et al., 2025
Aspilia africana (Pers.) C.D.Adams, Asteraceae	Wild sunflower	Herb	Whole plant	Endoparasites and fractures	Munengwa et al., 2025
A. mossambicensis (Oliv.) Wild, Asteraceae	Wild sunflower	Shrub	Whole plant	Gastric disorder, pain and smelly diarrhoea	Munengwa et al., 2025
Baccharoides adoensis (Sch. Bip. ex Walp.) H.Rob., Asteraceae	-	Herb	Roots	Endoparasites and internal wounds	Munengwa et al., 2025
**Bidens pilosa* L., Asteraceae	Black-jack	Herb	Leaves	Inflammation, ulcers and wounds	Munengwa et al., 2025
Bobgunnia madagascariensis (Desv.) J.H.Kirkbr. & Wiersama, Fabaceae	Snake bean	Tree	Pods	Diarrhoea, gut worms and kidney problems	Munengwa et al., 2025
Boophone disticha (L.f.) Herb., Amaryllidaceae	Windball	Herb	Whole plant	Digestive problems, endoparasites, infertility and pain	Munengwa et al., 2025
Burkea africana Hook., Fabaceae	Wild seringa	Tree	Roots	Diarrhoea, gastrointestinal problems and poison antidote	Munengwa et al., 2025
**Capsicum annuum* L., Solanaceae	Pepper	Herb	Pods	Bloating and diarrhoea	Maroyi, 2012; Jambwa and Nyahangare, 2020; Munengwa et al., 2025
Carissa spinarum L., Apocynaceae	Simple-spined num-num	Shrub	Leaves or roots	Endoparasites, gut problems, mouth ulcers, ticks and tick-borne diseases	Nyahangare et al., 2015; Jambwa and Nyahangare, 2020; Munengwa et al., 2025
Cassia abbreviata Oliv., Fabaceae	Long-tail cassia	Shrub	Bark or leaves	Bloating, diarrhoea, ectoparasites, gastrointestinal nematodes, gut worms, inflammation, internal wounds, pain, ticks and tick-borne diseases	Nyahangare et al., 2015; Jambwa and Nyahangare, 2020; Munengwa et al., 2025, 2026
**Catharanthus roseus* (L.) G.Don, Apocynaceae	Madagascar periwinkle	Shrub	Roots	Endoparasites and tick-borne diseases	Munengwa et al., 2025
Catunaregam taylorii (S.Moore) Bridson, Rubiaceae	Miombo bone-apple	Shrub	Leaves or roots	Diarrhoea, endoparasites, eye infections and infertility	Munengwa et al., 2025
Cissus quadrangularis L., Vitaceae	Adamant creeper	Climber	Stems	Eye infections, speed up labour, ticks and tick-borne diseases	Gelfand et al., 1985; Maroyi, 2012; Nyahangare et al., 2012, 2017; Jambwa and Nyahangare, 2020
Combretum molle R.Br. ex G.Don, Combretaceae	Velvet bushwillow	Tree	Leaves	Diarrhoea and gut worms	Munengwa et al., 2025

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Table 2b: Medicinal plants used as ethnoveterinary medicines against goat diseases and ailments in Zimbabwe

Scientific name and family	Common name	Habit	Plant part used	Disease or ailment	Reference
Crinum macowanii Baker, Amaryllidaceae	River crinum	Herb	Leaves	Mastitis and promotes lactation	Munengwa et al., 2025
Cucumis anguria L., Cucurbitaceae	Maroon cucumber	Climber	Fruits or leaves	Ecto/endoparasites, constipation, ticks and tick-borne diseases	Nyahangare et al., 2015; Jambwa and Nyahangare, 2020; Munengwa et al., 2025
Cynanchum viminale (L.) L., Apocynaceae	Caustic vine	Climber	Whole plant	Constipation, diarrhoea, endoparasites, internal wounds, mastitis, and promotes lactation.	Maroyi, 2012; Jambwa and Nyahangare, 2020; Munengwa et al., 2025
Dalbergia nitidula Welw. ex Baker, Fabaceae	Purple-wood dalbergia	Tree	Bark	Ulcers and wounds	Munengwa et al., 2025
**Datura stramonium* L., Solanaceae	Thorn apple	Herb	Leaves	Ectoparasites, ticks, tick-borne diseases and wounds	Nyahangare et al., 2015; Jambwa and Nyahangare, 2020; Munengwa et al., 2025
Dichrostachys cinerea (L.) Wight & Arn., Fabaceae	Sickle bush	Shrub	Leaves, pods or roots	Dermatophilosis, diarrhoea, endoparasites, rectal prolapse and wounds	Jambwa and Nyahangare, 2020; Munengwa et al., 2025
Dicoma anomala Sond., Asteraceae	Fever bush	Herb	Roots or whole plant	Breathing difficulties, endoparasites and wounds	Munengwa et al., 2025
Dracaena aethiopica (Thunb.) Byng & Christenh., Asparagaceae	Mother-in-law's tongue	Shrub	Bark	Ectoparasites, inflammation and wounds	Nyahangare et al., 2015; Munengwa et al., 2025
Ekebergia benguelensis Welw. ex C.DC., Meliaceae	Woodland dogplum	Tree	Leaves	Endoparasites and kidney problems	Munengwa et al., 2025
Elephantorrhiza elephantina (Burch.) Skeels, Fabaceae	Elephant root	Suffrutex	Roots	Body weakness, colic pain, diarrhoea and infertility	Munengwa et al., 2025
Eriosema shirense Baker f., Fabaceae	Tsombori	Herb	Roots	Appetite stimulant, bloating and endoparasites	Munengwa et al., 2025
Erythrina abyssinica Lam., Fabaceae	Lucky-bean tree	Tree	Bark	Colic pain, constipation, digestive problems, endoparasites, gastrointestinal nematodes, internal wounds and kidney problems	Munengwa et al., 2025, 2026
Euclea divinorum Hiern, Ebenaceae	Magic guarri	Shrub	Bark	Gastrointestinal nematodes, theileriosis and ticks	Nyahangare et al., 2015; Munengwa et al., 2025, 2026
Euphorbia ingens E.Mey. ex Boiss., Euphorbiaceae	Candelabra tree	Tree	Whole plant	Ticks and wounds	Nyahangare et al., 2015; Munengwa et al., 2025
Ficus stuhlmannii Warb., Moraceae	Lowveld fig	Tree	Bark	Ulcers and wounds	Munengwa et al., 2025
F. sur Forssk., Moraceae	Cape fig	Tree	Bark	Influenza and pneumonia	Munengwa et al., 2025
Garcinia buchananii Baker, Clusiaceae	Granite garcinia	Tree	Leaves	Diarrhoea and endoparasites	Munengwa et al., 2025
Harpagophytum spp., Pedaliaceae	(Devil's claw)	Herb	Leaves and tubers	Joint pains, mange sores and wounds	Ncube et al., 2022
Heteromorpha arborescens (Spreng.) Cham. & Schltdt., Apiaceae	Parsley tree	Tree	Roots	Endoparasites and mouth ulcers	Munengwa et al., 2025

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Table 2c: Medicinal plants used as ethnoveterinary medicines against goat diseases and ailments in Zimbabwe

Scientific name and family	Common name	Habit	Plant part used	Disease or ailment	Reference
Hypoxis obtusa Burch. ex Ker Gawl., Hypoxidaceae	African potato	Herb	Bulb	Abortion, boost libido, endoparasites, retained placenta, uterine prolapse and venereal ulcers.	Munengwa et al., 2025
Julbernardia globiflora (Benth.) Troupin, Fabaceae	Mnondo	Tree	Bark	Endoparasites and stomach disorders	Munengwa et al., 2025
Kigelia africana (Lam.) Benth., Bignoniaceae	Sausage tree	Tree	Fruits or roots	Appetite stimulant, boost libido, endoparasites, gastric disorders, gastrointestinal nematodes, pain, septic wounds and venereal ulcers.	Marandure, 2016; Jambwa and Nyahangare, 2020; Munengwa et al., 2025, 2026
Lannea discolor (Sond.) Engl., Anacardiaceae	Live-long	Tree	Bark	Endoparasites, kidney problems and stomach disorders	Munengwa et al., 2025
L. edulis (Sond.) Engl., Anacardiaceae	Wild grape	Suffrutex	Roots	Abortion, boost libido, endoparasites, inflammation, internal wounds, retained placenta and urinary problems.	Munengwa et al., 2025
Lasiosiphon kraussianus (Meisn.) Meisn., Thymelaeaceae	Yellow-heads	Herb	Roots	Endoparasites and ticks	Nyahangare et al., 2015; Munengwa et al., 2025
Leucas martinicensis (Jacq.) R.Br., Lamiaceae	Whitewort	Herb	Bark or whole plant	Abscesses, ectoparasites, inflammation, mouth ulcers, rectal prolapse and wounds	Munengwa et al., 2025
Linzia glabra Steetz, Asteraceae	Wild heliotrope	Herb	Whole plant	Diarrhoea, endoparasites and stomach disorders	Munengwa et al., 2025
Lippia javanica (Burm.f.) Spreng., Verbenaceae	Fever tea	Shrub	Leaves or twigs	Ecto/endoparasites, pneumonia, ticks and tick-borne diseases	Madzimure et al., 2011; Nyahangare et al., 2015; Jambwa and Nyahangare, 2020; Munengwa et al., 2025
**Melia azedarach* L., Meliaceae	Syringa	Tree	Bark or leaves	Ectoparasites and gut worms	Munengwa et al., 2025
Myrothamnus flabellifolius Welw., Myrothamnaceae	Resurrection bush	Shrub	Whole plant	Endoparasites, heart water and stomach disorders	Maroyi, 2012; Jambwa and Nyahangare, 2020; Munengwa et al., 2025
**Nicotiana tabacum* L., Solanaceae	Tobacco	Herb	Leaves	Ectoparasites and wounds	Nyahangare et al., 2015; Munengwa et al., 2025
**Opuntia ficus-indica* (L.) Mill., Cactaceae	Sweet prickly-pear	Shrub	Roots	Blood-stained diarrhoea and endoparasites	Munengwa et al., 2025
Ozoroa insignis Delile, Anacardiaceae	Raisin bush	Tree	Roots	Abortion, diarrhoea and retained placenta	Munengwa et al., 2025
Pachycarpus bisacculatus (Oliv.) Goyder, Apocynaceae	-	Herb	Roots	Endoparasites and smelly diarrhoea	Munengwa et al., 2025
Parinari curatellifolia Planch. ex Benth., Chrysobalanaceae	Mobola plum	Tree	Roots	Bloody diarrhoea, body weakness, diarrhoea and endoparasites	Maroyi, 2012; Jambwa and Nyahangare, 2020; Munengwa et al., 2025
Piliostigma thonningii (Schumach.) Milne-Redh., Fabaceae	Camel-foot	Tree	Bark or pods	Appetite stimulant, body weakness and diarrhoea	Munengwa et al., 2025

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Table 2d: Medicinal plants used as ethnoveterinary medicines against goat diseases and ailments in Zimbabwe

Scientific name and family	Common name	Habit	Plant part used	Disease or ailment	Reference
Pouzolzia mixta Solms, Urticaceae	Soap nettle	Tree	Bark, leaves, roots or stems	Bloating, fractures, constipation, dilation of birth canal, dystocia, retained placenta, and snakebite	Maroyi, 2012; Marandure, 2016; Jambwa and Nyahangare, 2020; Munengwa et al., 2025
Pseudolachnostylis maprouneifolia Pax, Phyllanthaceae	Duiker-berry	Tree	Leaves or roots	Diarrhoea, ectoparasites, foot rot and gut worms	Maroyi, 2012; Jambwa and Nyahangare, 2020; Munengwa et al., 2025
Psydrax lividus (Hiern) Bridson, Rubiaceae	Green-twigs quar	Shrub	Leaves	Ecto/endoparasites, gastro-intestinal obstruction, ticks, tick-borne diseases and wounds	Chavhunduka, 1976; Maroyi, 2012; Nyahangare et al., 2015; Jambwa and Nyahangare, 2020; Munengwa et al., 2025
Pterocarpus angolensis DC., Fabaceae	Bloodwood	Tree	Bark, roots or stems	Dermatophilosis, ecto/endoparasites, eye infections, gastric disorders, stomach disorders, ticks and wounds	Maroyi, 2012; Nyahangare et al., 2015; Jambwa and Nyahangare, 2020; Munengwa et al., 2025
P. rotundifolius (Sond.) Druce, Fabaceae	Round-leaved bloodwood	Tree	Roots	Gut worms, stomach disorders, ticks and wounds	Munengwa et al., 2025
Rothmannia manganjae (Hiern) Keay, Rubiaceae	Scented bells	Tree	Leaves	Abscesses, fracture pains, inflammation, scabs, ticks and wounds	Munengwa et al., 2025
**Ricinus communis* L., Euphorbiaceae	Castor-oil plant	Shrub	Leaves	Boost libido, endoparasites, infertility, retained placenta, ticks and tick-borne diseases.	Nyahangare et al., 2015; Jambwa and Nyahangare, 2020; Munengwa et al., 2025
Securidaca longepedunculata Fresen., Polygalaceae	Violet tree	Tree	Roots	Endoparasites and stomach disorder	Munengwa et al., 2025
Senna singueana (Delile) Lock, Fabaceae	Winter cassia	Tree	Roots	Diarrhoea, ecto/endoparasites and gastrointestinal nematodes	Nyahangare et al., 2015; Munengwa et al., 2025, 2026
Sesamum eriocarpum (Decne.) Byng & Christenh., Pedaliaceae	Stud thorn	Climber	Whole plant	Abortion, dilation of birth canal and retained placenta	Munengwa et al., 2025
S. senecioides (Klotzsch) Byng & Christenh., Pedaliaceae	Devil thorn	Climber	Whole plant	Abortion, constipation, dilation of birth canal and retained placenta	Chavunduka, 1976; Munengwa et al., 2025
Solanum campylacanthum Hochst. ex A.Rich., Solanaceae	Bitter apple	Shrub	Fruits or roots	Babesiosis, ecto/endoparasites and eye infections	Nyahangare et al., 2015; Munengwa et al., 2025
**S. lycopersicum* L., Solanaceae	Tomato	Herb	Leaves	Ear ulcers, scabs around mouth and wounds	Munengwa et al., 2025
Steganotaenia araliacea Hochst., Apiaceae	Carrot-tree	Tree	Roots	Blood-stained diarrhoea, colic pain and kidney problems	Munengwa et al., 2025
Strelitzia nicolai Regel & Körn., Strelitziaceae	Natal mock banana	Tree	Fruits	Scabs around the mouth and wounds	Munengwa et al., 2025

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Table 2e: Medicinal plants used as ethnoveterinary medicines against goat diseases and ailments in Zimbabwe

Scientific name and family	Common name	Habit	Plant part used	Disease or ailment	Reference
Strychnos spinosa Lam., Loganiaceae	Spiny monkey-orange	Tree	Fruits	Corneal opacity, ecto/endoparasites, ticks and tick-borne diseases	Madzimure et al., 2011; Nyahangare et al., 2015; Jambwa and Nyahangare, 2020; Munengwa et al., 2025
Terminalia sericea Burch. ex DC., Combretaceae	Silver terminalia	Tree	Bark or leaves	Constipation, diarrhoea in kids, ectoparasites, ticks and tick-borne diseases	Nyahangare et al., 2015; Jambwa and Nyahangare, 2020; Munengwa et al., 2025
Turraea nilotica Kotschy & Peyr., Meliaceae	Small mahogany	Shrub	Roots	Endoparasites, pain and urinary problems	Munengwa et al., 2025
Vachellia amythethophylla (Steud. ex A.Rich.) Kyal. & Boatwr., Fabaceae	Large-leaved acacia	Shrub	Roots	Endoparasites and pain	Munengwa et al., 2025
Vangueria infausta Burch., Rubiaceae	Velvet wild medlar	Tree	Leaves	Diarrhoea and endoparasites	Munengwa et al., 2025
Vitex payos (Lour.) Merr., Lamiaceae	Chocolate berry	Tree	Roots	Constipation, diarrhoea and endoparasites	Munengwa et al., 2025
Ximenia caffra Sond., Olacaceae	Sourplum	Tree	Bark or fruits	Dermatophilosis, endoparasites, reproductive problems and wounds	Jambwa and Nyahangare, 2020; Munengwa et al., 2025

Table 3: Families with the highest number of species used as ethnoveterinary medicines (at least 2 species each)

Family	No. of species	%
Amaryllidaceae	2	2.6
Apiaceae	2	2.6
Combretaceae	2	2.6
Euphorbiaceae	2	2.6
Lamiaceae	2	2.6
Moraceae	2	2.6
Anacardiaceae	3	3.9
Asparagaceae	3	3.9
Meliaceae	3	3.9
Pedaliaceae	3	3.9
Apocynaceae	4	5.3
Rubiaceae	4	5.3
Solanaceae	5	6.6
Asteraceae	6	7.9
Fabaceae	14	18.4

Growth habit and parts used

Trees (43%), herbs (23%) and shrubs (22%) are the primary sources of medicinal plants used to treat and manage goat diseases and ailments in Zimbabwe (Figure 3A). The plant parts used to prepare ethnoveterinary medicines used against goat diseases include stems, bulbs, whole plants, fruits, bark,

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
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leaves, roots, pods, twigs and tubers (Figure 3B). Roots (38.2%), leaves (30.3%), bark (21.2%) and whole plants (18.4%) are the main plant parts used to prepare ethnoveterinary medicines used to treat and manage goat diseases (Figure 3B). The use of roots, whole plants, and bark is a major conservation concern as harvesting of these parts determines the survival of targeted medicinal plants. Field studies show that plants usually die after where bark or underground parts such as bulbs, corms, rhizomes, roots, or tubers are harvested, while collection of flowers, leaves, seeds, fruits, or other aerial parts is considered to be less destructive (Van Andel and Havinga, 2008; Van Wyk and Prinsloo, 2018).

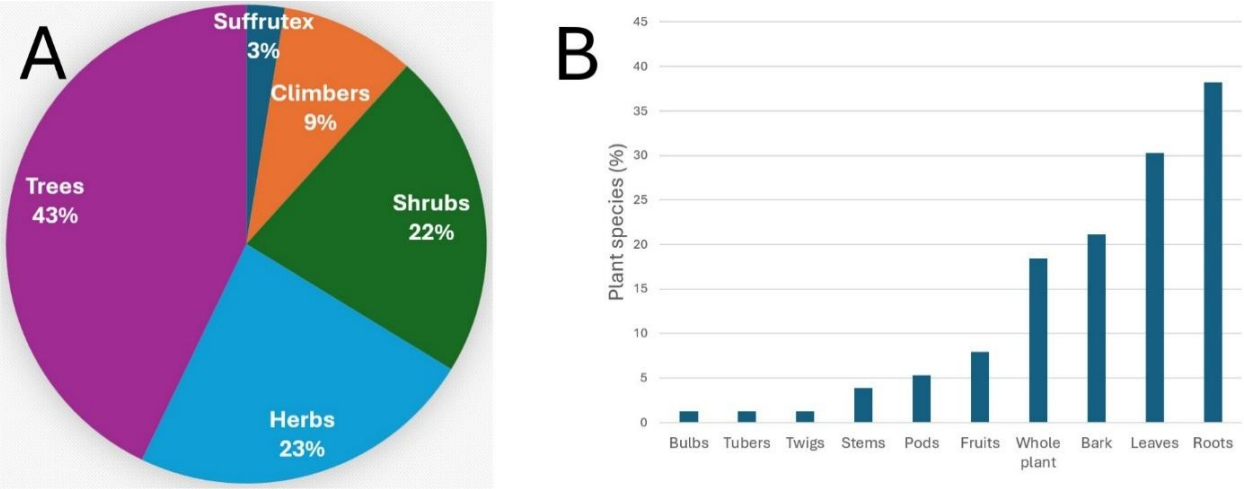

Figure 3: Characteristics of medicinal plants used against goat diseases in Zimbabwe. (A) Growth form represented in pie diagram and (B) plant parts used represented in bar chart

Disease categories

This study showed that medicinal plants are used to treat and manage 62 goat diseases and ailments in Zimbabwe (Table 2). More than half of the recorded medicinal plants (53.9%; n = 41) are used to treat and manage endoparasites, followed by diarrhoea and wounds (26.3%; n= 20 each), ecto–parasites and ticks (21.1%; n = 16 each) and tick-borne diseases (14.5%; n = 11) (Table 4). More than a quarter of the species (26.3%; n = 20) are widely used as sources of ethnoveterinary medicines in Zimbabwe to treat and manage goat diseases and ailments (Figure 3). These species include *Annona senegalensis* Pers., *Asparagus africanus* Lam., *Carissa spinarum* L., *Cassia abbreviata* Oliv., *Cucumis anguria* L., *Cynanchum viminale* (L.) L., *Dichrostachys cinerea* (L.) Wight & Arn., *Erythrina abyssinica* Lam., *Hypoxis obtusa* Burch. ex Ker Gawl., *Kigelia africana* (Lam.) Benth., *Lannea edulis* (Sond.) Engl., *Leucas martinicensis* (Jacq.) R.Br., *Lippia javanica* (Burm.f.) Spreng., *Pouzolzia mixta* Solms, *Psydrax lividus* (Hiern) Bridson, *Pterocarpus angolensis* DC., *Rothmannia manganjae* (Hiern) Keay, *Ricinus communis* L., *Strychnos spinosa* Lam. and *Terminalia sericea* Burch. ex DC., which are used to treat and manage at least five goat diseases and/or ailments (Table 2). Similarly, previous research conducted in Botswana, the Democratic Republic of Congo and South Africa showed that *A. senegalensis*, *C. abbreviata*, *K. africana* and *T. sericea* are important *materia medica* in managing goat diseases and ailments in these countries (Setlalekgomo and Setlalekgomo, 2013; Mavungu et al., 2023; Lechani et al., 2024; Shai and Sebola, 2026).

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
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Table 4: Major categories of goat diseases and ailments treated and managed by medicinal plants in Zimbabwe

Disease category	No. of species	%
Endoparasites	41	53.9
Diarrhoea	20	26.3
Wounds	20	26.3
Ectoparasites	16	21.1
Ticks	16	21.1
Tick-borne diseases	11	14.5
Retained placenta	8	10.5
Stomach disorders	8	10.5
Constipation	7	9.2
Gut worms	7	9.2
Inflammation	7	9.2
Pain	7	9.2
Abortion	6	7.9
Internal wounds	6	7.9
Gastro-intestinal problems	5	6.6
Kidney problems	5	6.6

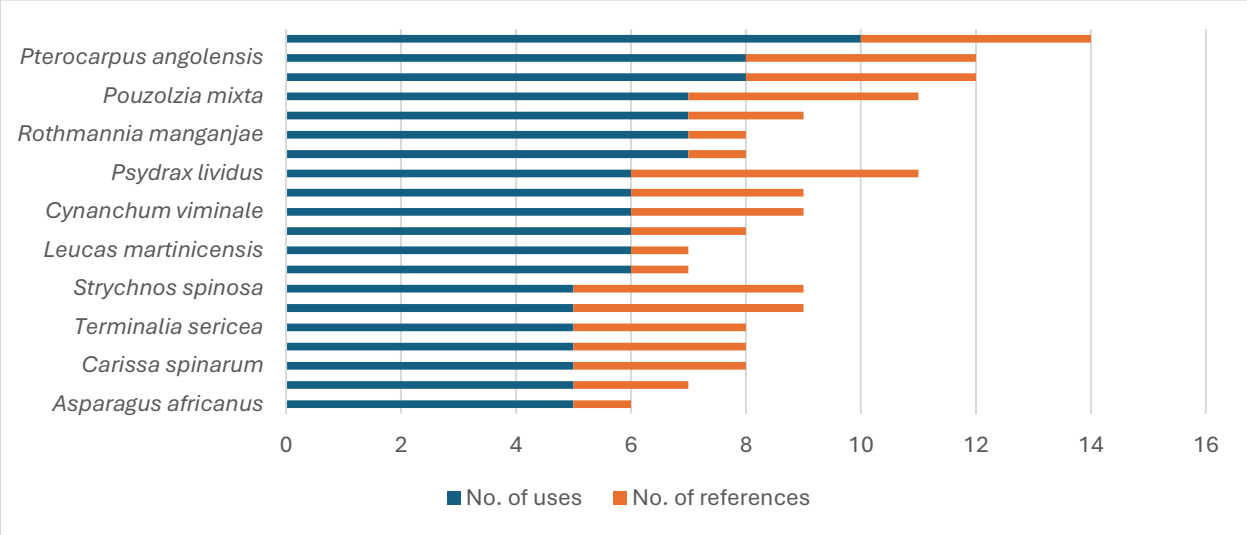

Figure 3: Medicinal plants used against goat diseases in Zimbabwe

Conclusion

This study provided traditional ecological knowledge about medicinal plants used to treat and manage goat diseases and ailments in Zimbabwe. Such information about the species used, plant parts utilized, and diseases treated and/or managed will contribute to the improved management and sustainable utilization of ethnoveterinary medicines in the country. In addition to this, there is a need for advanced ethnopharmacological evaluations of plant species used as ethnoveterinary medicines. Such further studies include isolating the active constituents of the species and assessing the *in vitro* and/or *in vivo* efficacy of the identified medicinal plant species against the targeted goat diseases and ailments. Furthermore, toxicological evaluations should be conducted to ensure that the identified plant species are safe to use as ethnoveterinary medicines.

Limitations of the study

Identification and access to relevant literature focusing on ethnoveterinary medicines used for treating and managing goat diseases in Zimbabwe was a major challenge. This is partly due to the fact that ethnobotanical literature focusing on ethnoveterinary medicines frequently groups livestock species together, and often does not specify remedies used against goats only but all livestock species, that is, cattle, goats, sheep, and in some cases even donkeys and horses.

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/trq3a006
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Therefore, this probably resulted in publication bias, as it caused subjectivity in the interpretation and synthesis of the research findings. The research findings of this study were generated from ethnobotanical literature sources, based on individual traditional ecological knowledge and experiences. Such a set of data obtained from participants is unique and biased as a result of subjective self-reporting and individual lived experiences. It is also important to note that additional evaluations with respect to efficacy and safety of documented medicinal plants are required, as reported therapeutic effects are based solely on traditional ecological knowledge provided by the participants.

Acknowledgments
The author would like to thank the reviewers for their comments and suggestions, which greatly improved the final quality of the manuscript.

Author contributions
I am solely responsible for the conception and design of the research work, data collection, analysis, interpretation of the data, and writing of the manuscript.

Registration and protocol
The review was not registered, and a protocol was not prepared.

Competing interests
The author declares that there is no conflict of interest associated with this research.

List of abbreviations
APG - Angiosperm Phylogeny Group
POWO - Plants of the World Online
PRISMA - Preferred Reporting Items for Systematic Reviews and Meta-analyses

Availability of data, code, and other materials
All data generated or analyzed during this study are included in this article.

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e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
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Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
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Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/trq3a006
Review Article

Publisher details

Student's Journal of Health Research (SJHR)
(ISSN 2709-9997) Online
(ISSN 3006-1059) Print
Category: Non-Governmental & Non-profit Organization
Email: studentsjournal2020@gmail.com
WhatsApp: +256 775 434 261
Location: Scholar's Summit Nakigalala, P. O. Box 701432, Entebbe Uganda, East Africa