Etnobiología, 2026, 24(2), ISSN: 2448-8151 **Artículos**

MEDICAL ETHNOENTOMOLOGY IN BRAZIL: A SCOPING REVIEW OF DOCUMENTED PRACTICES AND IMPLICATIONS FOR KNOWLEDGE DIALOGUE IN PUBLIC HEALTH

Etnoentomologia médica no brasil: uma revisão de escopo das práticas documentadas e implicações para o diálogo sobre conhecimento em saúde pública

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Abstract:

This study presents a scoping review with descriptive bibliometric components of the scientific literature addressing the medicinal use of insects by Brazilian communities. The objective was to organize and critically synthesize the documentation of medical ethnoentomological knowledge in Brazil, identifying taxonomic patterns, therapeutic contexts, and research trends without assuming biomedical efficacy. A comprehensive search was conducted primarily in Google Scholar, yielding 22 primary studies published through 2025. Data extraction followed the unit of analysis defined as a use-mention, corresponding to each reported association between an insect taxon and a therapeutic indication. A total of 88 use-mentions were identified. The results show that Hymenoptera, Blattodea, Orthoptera, and Coleoptera accounted for most reports, which may reflect ecological availability and cultural relevance in traditional medical practices. Respiratory conditions and pain-related symptoms were the most frequently cited therapeutic contexts, which may reflect recurrent symbolic and functional associations between insects and specific bodily afflictions. Geographically, studies were concentrated in northeastern Brazil, with additional records from the North, Central-West, and Southeast. The documented knowledge involved both traditional and non-traditional communities, indicating the broad circulation and adaptability of ethnoentomological practices across diverse social settings. The findings illuminate culturally situated knowledge systems shaped by long-term human–insect interactions, local ecological dynamics, and community-specific epistemologies. The synthesis also reveals substantial knowledge gaps, including the underrepresentation of several Brazilian regions and the limited documentation of many insect orders. These gaps reflect broader inequalities in research effort and underscore the need for interdisciplinary, ethically grounded studies that respect the epistemological integrity and autonomy of the communities involved. By mapping existing evidence and identifying research frontiers, this review strengthens the visibility and contextual understanding of medical ethnoentomology in Brazil.

Keywords: Ethnoentomology, Local ecological knowledge, Insect Orders, Therapeutic Uses, Traditional Communities.

Resumo:

Este estudo apresenta uma revisão de escopo com componentes bibliométricos descritivos da literatura científica que aborda o uso medicinal de insetos por comunidades brasileiras. O objetivo foi organizar e sintetizar criticamente a documentação do conhecimento etnoentomológico medicinal no Brasil, identificando padrões taxonômicos, contextos terapêuticos e tendências de pesquisa, sem assumir eficácia biomédica. A busca bibliográfica foi conduzida principalmente no Google Scholar, resultando na inclusão de 22 estudos primários publicados até 2025. A extração de dados seguiu a unidade de análise definida como uso-menção, correspondente a cada associação relatada entre um táxon de inseto e uma indicação terapêutica. Um total de 88 usos-menção foi identificado. Os resultados mostram que Hymenoptera, Blattodea, Orthoptera e Coleoptera representaram a maioria dos relatos, o que pode refletir a disponibilidade ecológica e a relevância cultural nas práticas médicas tradicionais. Condições respiratórias e sintomas relacionados à dor foram os contextos terapêuticos mais citados, o que pode refletir associações simbólicas e funcionais recorrentes entre insetos e doenças corporais específicas. Geograficamente, os estudos se concentraram no Nordeste do Brasil, com registros adicionais no Norte, Centro-Oeste e Sudeste. O conhecimento documentado envolveu comunidades tradicionais e não tradicionais, indicando ampla circulação e adaptabilidade das práticas etnoentomológicas em diferentes contextos sociais. Os achados iluminam sistemas de conhecimento culturalmente situados, moldados por interações de longo prazo entre humanos e insetos, dinâmicas ecológicas locais e epistemologias comunitárias. A síntese também revela lacunas substanciais, incluindo a sub-representação de várias regiões brasileiras e a documentação limitada de diversas ordens de insetos. Essas lacunas refletem desigualdades mais amplas no esforço de pesquisa e reforçam a necessidade de estudos interdisciplinares e eticamente fundamentados que respeitem a integridade epistemológica e a autonomia das comunidades envolvidas. Ao mapear

as evidências existentes e identificar fronteiras de pesquisa, esta revisão fortalece a visibilidade e a compreensão contextual da etnoentomologia medicinal no Brasil.

Palavras-chave: Etnoentomologia, Conhecimento Ecológico Local, Ordens de Insetos, Usos Terapêuticos, Comunidades Tradicionais.

INTRODUCTION

Brazil plays a leading role in biodiversity, including within its population, which comprises both traditional communities that have developed their own ways of life and non-traditional communities residing in rural and urban areas (Iglesias, Carvalho & Pizzio, 2023). Among them, Indigenous peoples are one of the most diverse social groups in the country, with more than 305 ethnic groups distributed across different regions (Kabad *et al*., 2020; Sabadini, 2019).

In addition, other traditional populations, such as quilombolas, riverine communities, caiçaras, rubber tappers, chestnut collectors, and extractivists, number approximately 5 million nationwide (Grzebieluka, 2012).

This sociocultural diversity has contributed to the formation of what is broadly referred to as local ecological knowledge (LEK). Closely linked to territory, local ecosystems, and everyday practices, LEK has historically shaped how different groups understand health, illness, and care. In many contexts, taking care of health is inseparable from interacting with nature and managing environmental resources (Gonçalves & Palheta, 2012).

Insects are the most abundant and diverse group of animals worldwide, occupying virtually all ecosystems. More than 750,000 living species have been described, although estimates suggest that this number may be considerably higher (Hermógenes, 2016; Costa Neto & Resende, 2004). Within this context, ethnoentomology seeks to understand how human societies perceive, classify, and interact with insects across different cultural and linguistic settings (Petiza, 2011). From an ethnobiological perspective, these interactions are not limited to utilitarian uses but are embedded in broader systems of knowledge, symbolism, and experience, highlighting that here, medical ethnoentomology refers to culturally situated therapeutic knowledge and practices involving insects.

Although research in this field remains limited, several studies conducted in Brazil report the use of insects in health-related practices, including therapeutic and nutritional purposes (Hermógenes, 2016; Petiza, 2011; Costa Neto & Resende, 2004). These practices are grounded in long-term coexistence with local environments and are transmitted within families and communities, forming part of local knowledge systems. In many contexts, this knowledge is transmitted primarily through oral practices and everyday experience, which may limit its formal documentation and increase the risk of loss over time (Sinisterra & Ruiz, 2024; Berkes, 2012).

Some authors emphasize that LEK can generate new research questions and perspectives in the health field, particularly when different forms of knowledge are approached in complementary ways. Collaboration between traditional knowledge holders and scientific research, supported by public policies, may contribute to the investigation of biological resources while respecting cultural contexts (Nascimento, 2020; Costa *et al*., 2016; Santos, 2014). In this sense, insects may be understood as biocultural elements whose therapeutic relevance emerges from both ecological availability and cultural interpretation.

The relationship between ethnoentomology and public health is also relevant due to the frequent presence of insects in daily life and their potential influence on human well-being (Gonçalves & Palheta, 2012). In Brazil, the Unified Health System (SUS) has recognized certain tradition-based practices through the National Policy on Integrative and Complementary Health Practices, including apitherapy, which employs products derived from bees such as honey, propolis, and apitoxin (Brasil, 2018). This recognition does not

imply direct incorporation of popular practices into biomedical protocols, but it highlights institutional spaces where different knowledge systems may interact.

Discussions continue regarding the boundaries between traditional and biomedical practices, the robustness of available studies, and the criteria for including therapies in national health systems (Dall'Alba *et al.*, 2026). Nevertheless, the long-standing use of insects by Brazilian communities suggests a body of knowledge that merits careful documentation and critical analysis, particularly given the limited number of experimental studies addressing insects other than bees.

In this context, literature reviews with descriptive bibliometrics approaches are useful tools for organizing dispersed information, identifying research patterns, and highlighting knowledge gaps. Such approaches contribute to understanding how medical ethnoentomological knowledge has been documented and discussed in Brazil, while supporting critical reflection on its implications for ethnobiology and public health (Barros & Langhi, 2023).

Because studies on Brazilian medical ethnoentomology are methodologically heterogeneous — encompassing ethnographies, surveys, theses, and regional case studies — and frequently report emic categories that are not directly comparable across different contexts, a scoping review approach was adopted to map the existing evidence base and identify research gaps, rather than to estimate effects or validate therapeutic efficacy.

Therefore, this study aimed to review the scientific literature on the medicinal use of insects by Brazilian communities, reflecting on how this LEK can contribute to national public health, without presuming direct biomedical applicability. By synthesizing existing studies, we seek to provide an integrated overview of this field, discuss its contributions to ethnobiological knowledge, and reflect on its relevance to public health debates.

MATERIALS AND METHODS

This study was designed as a scoping review with descriptive bibliometric components, aimed at mapping and organizing the Brazilian scientific literature on the medicinal use of insects. Scoping reviews are particularly suitable for fields characterized by conceptual heterogeneity, diverse study designs, and limited standardization (Arksey & O'Malley, 2005).

Accordingly, the objective was to document patterns of knowledge production and reported uses. PRISMA guidelines were adopted as a reference framework for transparent reporting of the search and screening process, rather than as a protocol for a systematic review.

The primary literature search was conducted using Google Scholar in January 2026. This platform was selected for its broad coverage of multidisciplinary publications, its sensitivity to Portuguese-language literature, and its ability to retrieve gray literature, including master's dissertations and doctoral theses, which constitute a substantial portion of ethnobiological research in Brazil (Carilli *et al*., 2023). Equivalent queries were also applied in Scopus, Web of Science, LILACS, and SciELO. These databases returned either no eligible studies or only records already retrieved through Google Scholar and therefore did not expand the final corpus.

The search strategy was structured using Boolean operators to ensure replicability: (Inseto OR Etnoentomologia) AND ("uso medicinal" OR "recurso medicinal") AND (comunidade OR indígena OR quilombola OR tradicional OR nativo OR ancestral) AND (cura OR tratamento OR combate OR doença OR sintoma OR "saúde pública") AND Brasil. Searches were conducted without temporal restriction and excluded patents and citation-only records.

The review included only Portuguese-language publications, in accordance with its focus on Brazilian ethnoentomological knowledge as produced, recorded, and circulated within national academic contexts.

In this sense, language was employed as an analytical criterion to delimit the research corpus. The decision to publish the present synthesis in English reflects the effort to broaden the international visibility and accessibility of the documented body of knowledge.

Screening followed three sequential stages based on PRISMA 2020 (Page *et al*., 2021). First, titles retrieved from Google Scholar were screened using the Rayyan platform, allowing the exclusion of irrelevant publication types, duplicates, and studies unavailable in full. Second, titles and abstracts were evaluated, retaining only those aligned with the scope of the review. Third, potentially eligible studies underwent full-text assessment. Inclusion criteria comprised primary empirical studies conducted in Brazil that addressed the medicinal use of insects, were available in full text, and were published up to December 2025.

All screening procedures were conducted independently and in a blinded manner by both authors. Upon completion of the individual screening stages, any discrepancies were discussed and resolved through consensus, thereby enhancing the rigor and reliability of the study selection process.

Only scientific articles, monographs, dissertations, and theses were considered. In the meantime, the exclusion criteria comprised: publication type (books, primers, opinion article), duplicate studies, unavailable studies, non-relevant scope (works that do not address insects or publications addressing non-insect arthropods), different language, secondary studies (literature reviews, experimental studies); works restricted to apiculture, works that mentioned insects without associating them with medicinal practices (Figure 1).

Duplicates were removed based on titles and abstracts, and we also excluded theses or dissertations that to have been later developed into peer reviewed articles by the same authors on the same topic, when the corresponding article had already been included in the final analysis.

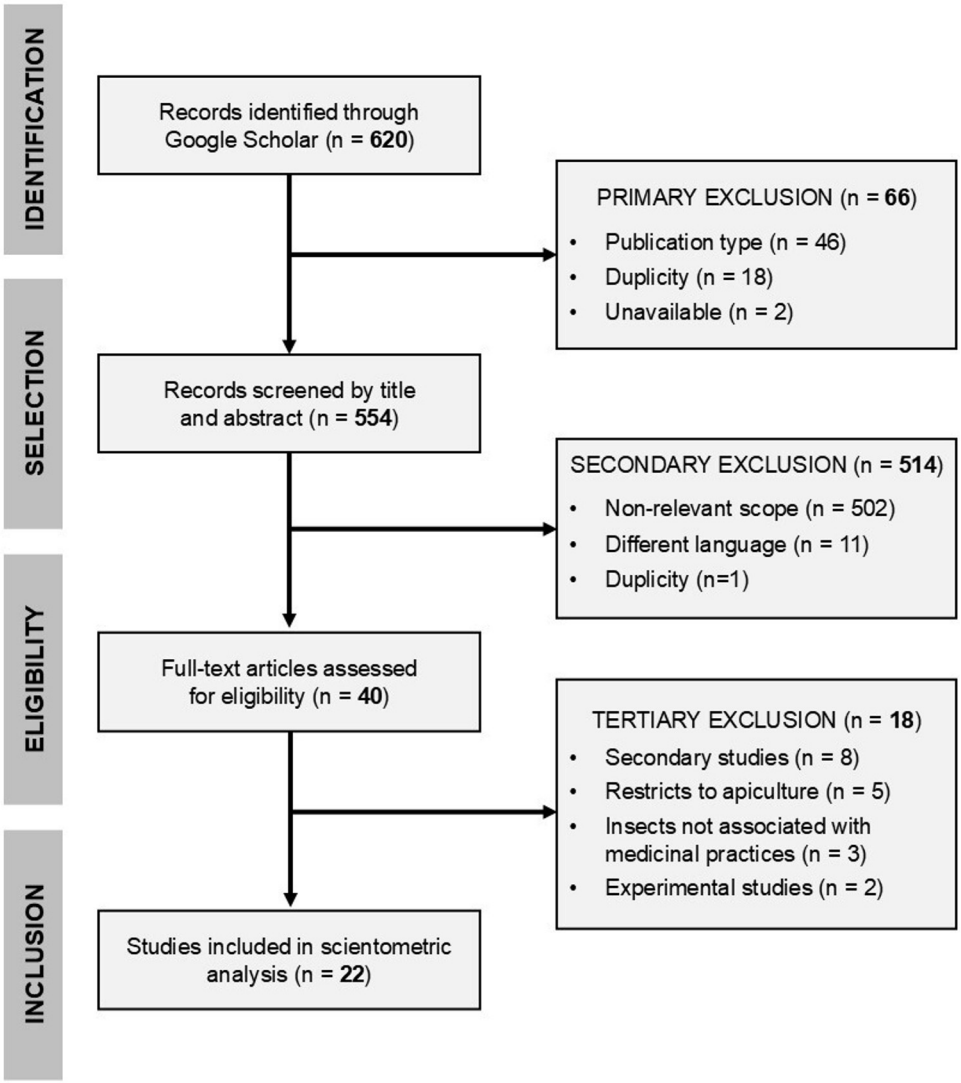


FIGURE 1
PRISMA style flowchart illustrating the identification, screening, eligibility assessment, and final inclusion of studies in the scoping review
Source: by the authors, 2026.

The included studies were first organized in ascending order of publication year, and each was assigned a unique identification number (ID). This coding system facilitated the visualization and comparison of the medicinal insect mentions reported across the analyzed works. For each included publication, the following variables were extracted: authorship, year of publication, period of fieldwork execution, type of community (traditional or non traditional), study location (municipality and state), participant profile (range of age - when available), insect orders and family, popular name, way of use, and reported diseases or symptoms associated.

The analytical unit was defined as a use mention, corresponding to each reported association between a specific insect taxon and a therapeutic indication. Diseases and symptoms were recorded as presented in the original studies and translated into English without reclassification, to preserve the disease concepts and health classifications as locally defined and understood by the communities and authors involved (emic categories).

Data were organized in matrix tables using Microsoft Excel (Office 365). Analysis followed a qualitative and descriptive bibliometrics approach, including the quantification of use mentions and the analysis of

temporal, spatial, and taxonomic distributions. Figures and graphs were generated using Excel, RAWGraphs, QGIS v.3.36, and Inkscape. Interpretation emphasized ethnobiological perspectives and explicitly avoided assumptions about pharmacological efficacy or biomedical validation.

RESULTS AND DISCUSSION

This scoping review identified 22 primary studies documenting the medicinal use of insects by Brazilian communities (Figure 1). By integrating descriptive results with interpretive analysis, this section examines how medical ethnoentomological knowledge has been documented in Brazil, emphasizing patterns of research production, taxonomic focus, therapeutic contexts, and sociocultural settings, without inferring biomedical efficacy (Nepomuceno & Carniatto, 2022; Hermógenes, 2016; Costa Neto & Resende, 2004).

When both publication year and period of fieldwork execution are considered, the temporal distribution of studies reveals an uneven and discontinuous pattern (Figure 2). Although publications span from 1999 to 2025, and execution from 1995-2023, most fieldwork activities are concentrated between the mid-2000s and the late 2010s.

Early contributions appear as isolated initiatives (Costa Neto, 1999; Costa Neto & Resende, 2004), followed by a period of greater overlap across different regions and insect orders (Hermógenes, 2016; Melo et al., 2015; Montenegro et al., 2014; Modro et al., 2009). This non-linear development pattern is consistent with observations made for Brazilian ethnobiological research more broadly, where studies are often localized, project-based, and dependent on specific institutional trajectories rather than continuous research programs (Barros & Langhi, 2023; Nepomuceno & Carniatto, 2022).

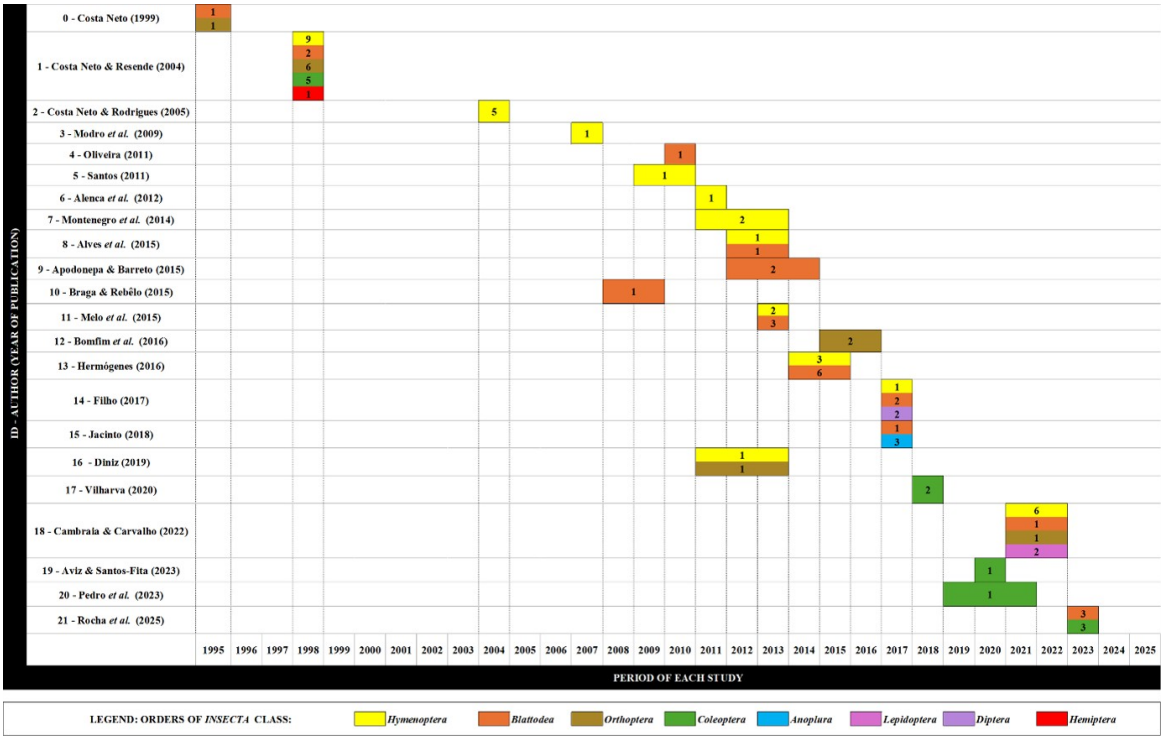


FIGURE 2

Timeline illustrating the publication years, study period, taxonomic focus, and number of mentions per Insecta order documented in the 22 ethnoentomological studies included in the scoping review. Colored segments represent the insect orders addressed in each study. The length of each box means the duration of each study, and the number inside each box means the quantity of use-mention of each taxon. Source: by the authors, 2026.

Several early contributions to Brazilian medical ethnoentomology were produced in Bahia (e.g., Costa Neto 1999; Costa Neto & Resende 2004), which helps explain why later studies often cite this foundational regional literature (Bonfim *et al*., 2016; Apodonepa & Barreto, 2015; Montenegro *et al*., 2014; Alencar *et al*., 2012).

The geographic distribution of the studies reveals a marked concentration in northeastern Brazil, particularly in the states of Bahia, Paraíba, Piauí, Maranhão, Rio Grande do Norte, and Ceará. Within this regional cluster, the order *Hymenoptera* was the most frequently cited, totaling 25 mentions. In contrast, only Amazonas and Pará contributed records from the North Region, and only Mato Grosso and Mato Grosso do Sul from the Central-West. Notably, the South Region was the only macro-region without any documented use of insects for medicinal purposes (Figure 3).

Similar regional clustering has been reported in broader syntheses of Brazilian ethnobiology and ethnozoology, reflecting the historical consolidation of research groups and graduate programs in these regions (Iglesias, Carvalho & Pizzio, 2023; Hermógenes, 2016).

This pattern should not be interpreted as evidence that insect-based medicinal practices are more prevalent or culturally significant in northeastern Brazil. Instead, it highlights structural asymmetries in research effort and academic visibility, with large portions of the North, Midwest, and Southeast remaining comparatively underdocumented (Nepomuceno & Carniatto, 2022).

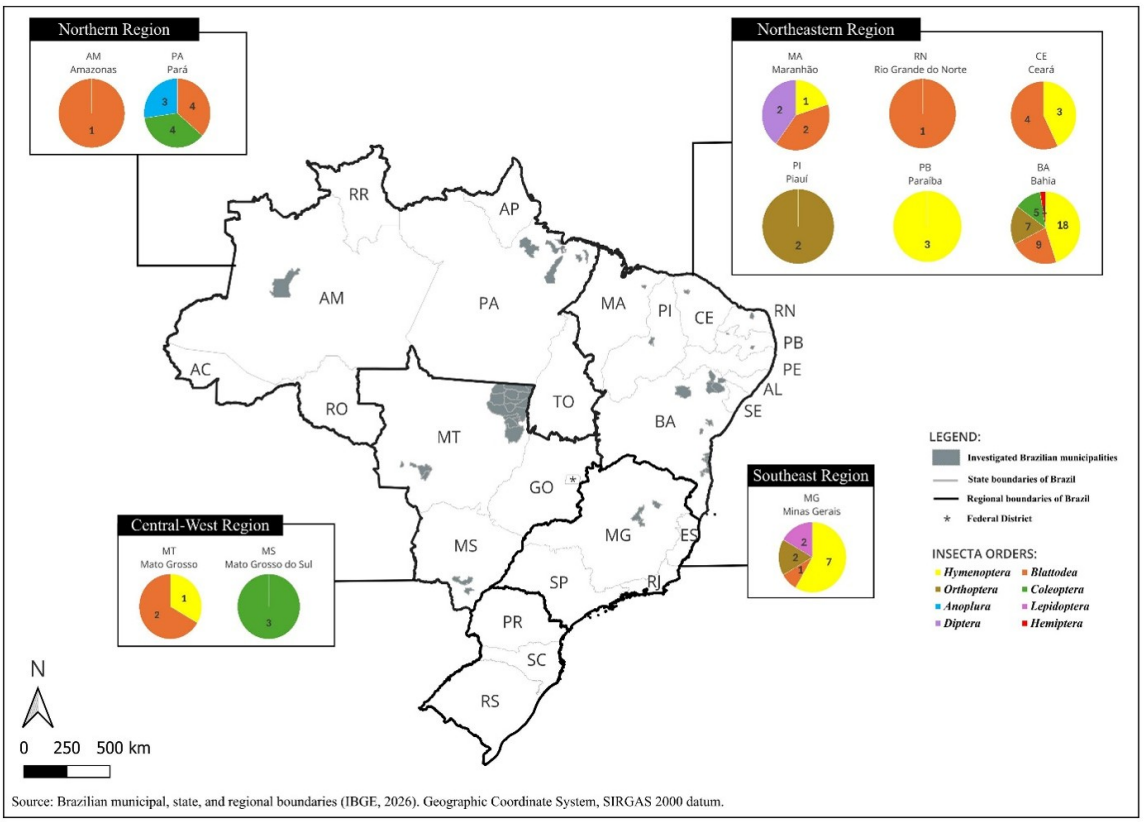


FIGURE 3

Spatial mapping of Brazilian regions, states, and municipalities with records of medicinal use of insects and categorization of these mentions cited in the 22 studies included in the scoping review. The pie charts represent the relative frequency of insect orders reported in each locality, highlighting the regional variation in ethnoentomological knowledge.
Source: by the authors, 2026

From a knowledge-gap perspective, the findings highlight the need to expand research efforts in regions that remain poorly documented, particularly the South, the Southeast, parts of the Central-West, and the Brazilian Amazon. Future studies should investigate whether the low number of records in these areas

reflects a scarcity of ethnoentomological research, erosion of traditional knowledge, cultural differences in the medicinal use of animal resources, or socio-environmental changes that shape interactions between local communities and insects. Additionally, examining less frequently cited insect orders may uncover new contexts of use and further enrich the understanding of the biocultural diversity associated with medicinal insects.

The reviewed studies involved both traditional communities—including indigenous, quilombola, and extractivist populations and non-traditional communities, such as rural residents, market vendors, and farming households (Table 1). Similar overlaps between traditional and non-traditional settings have been reported in other ethnobiological surveys, indicating that local ecological knowledge circulates beyond formally recognized traditional groups (Koop & Volpi, 2021; Costa Neto & Rodrigues, 2005).

Participant profiles encompassed children, adults, and older adults, suggesting intergenerational transmission of knowledge, primarily through oral practices and everyday experience. This mode of transmission has been widely described in Brazilian ethnobiological literature and is recognized both as a source of resilience and as a vulnerability, given limited formal documentation and increasing social change (Cambraia & Carvalho, 2022; Santos, 2014; Gonçalves & Palheta, 2012).

ID	AUTHOR (YEAR)	COMMUNITY	MUNICIPALITY	STATE	TARGET GROUP	SAMPLE SIZE	AGE RANGE
0	Costa Neto (1999)	Traditional Indigenous	Paulo Afonso, Jeremoabo, Canudos and Macurerê	BA	Residents	15	>18
1	Costa Neto & Resende (2004)	Non-traditional	Feira de Santana	BA	Market vendors	10	48 to 75
2	Costa Neto & Rodrigues (2005)	Non-traditional	Santa Terezinha	BA	Residents	49	9 to 85
3	Modro *et al.* (2009)	Non-traditional	Microregião do Araguaia (Alto Boa Vista, Bom Jesus do Araguaia, Cana Brava do Norte, Confresa, Estrela do Araguaia, Luciara, Porto Alegre do Norte, Ribeirão Cascalheira, Santa Cruz do Xingu, Santa Terezinha, São Félix do Araguaia, São José do Xingu, Serra Nova Dourada and Vila Rica)	MT	Residents and special guests	31	—-
4	Oliveira (2011)	Non-traditional	Pedro Avelino	RN	Residents	30	18 to 88
5	Santos (2011)	Traditional Quilombola	Campo Formoso	BA	Farmers and homemakers	39	15 to 82
6	Alencar *et al.* (2012)	Non-traditional	Lagoa	PB	Heads of households	67	—-
7	Montenegro *et al.* (2014)	Non-traditional	Cabaceiras	PB	Heads of households	112	—-
8	Alves *et al.* (2015)	Non-traditional	Groaíras	CE	Residents	34	15 to >60
9	Apodonepa & Barreto (2015)	Traditional Indigenous	Barra do Bugres	MT	Residents	106	15 to 67
10	Braga e Rebêlo (2015)	Traditional Extractivist	Juruá	AM	Experienced fishermen	65	—-
11	Melo *et al.* (2015)	Non-traditional	Cariré	CE	Residents	49	18 to >60
12	Bomfim *et al.* (2016)	Non-traditional	Nazaré do Piauí	PI	Family representatives	89	18 to 82
13	Hermógenes (2016)	Non-traditional	Arataca, Camacan, Ilhéus, Olivença, Itacaré, Maraú, Una and Uruçuca	BA	Residents	50	18 to 89
14	Filho (2017)	Traditional Quilombola	Mata Roma	MA	Residents	60	18 to 75
15	Jacinto (2018)	Traditional Extractivist	Breves	PA	Key informants	25	27 to >60
16	Diniz (2019)	Traditional Quilombola	Minas Novas	MG	Quilombola farmers	—-	—-
17	Vilharva (2020)	Traditional Indigenous	Juti	MS	—-	—-	—-
18	Cambraia & Carvalho (2022)	Traditional Quilombola	Serro and Diamantina	MG	—-	—-	—-
19	Aviz & Santos-Fita (2023)	Traditional Quilombola	Santa Luzia do Pará	PA	Residents	36	≥20
20	Pedro *et al.* (2023)	Traditional Indigenous	Dourados	MS	Elders	—-	—-
21	Rocha *et al.* (2025)	Non-traditional	Belém, Benevides, Moju, Irituia, Ponta de Pedras and Salvaterra	PA	Residents	43	—-

TABLE 1

General characteristics of the scientific studies included in the scoping review on medical ethnoentomology in Brazil. The table summarizes authority and year of publication, type of community investigated (traditional or non-traditional), study location (municipality

Source: by the authors, 2026.

A total of 88 use mentions were identified, defined as reported associations between an insect taxon and a therapeutic indication. Slightly more than half of these referred to symptom relief (55%, n=48), while the remainder related to disease treatment (45%, n=40). The insect orders *Hymenoptera* (n=33), *Blattodea* (n=24), *Coleoptera* (n=12) and *Orthoptera* (n=11) accounted for most documented use mentions (Figure 4).

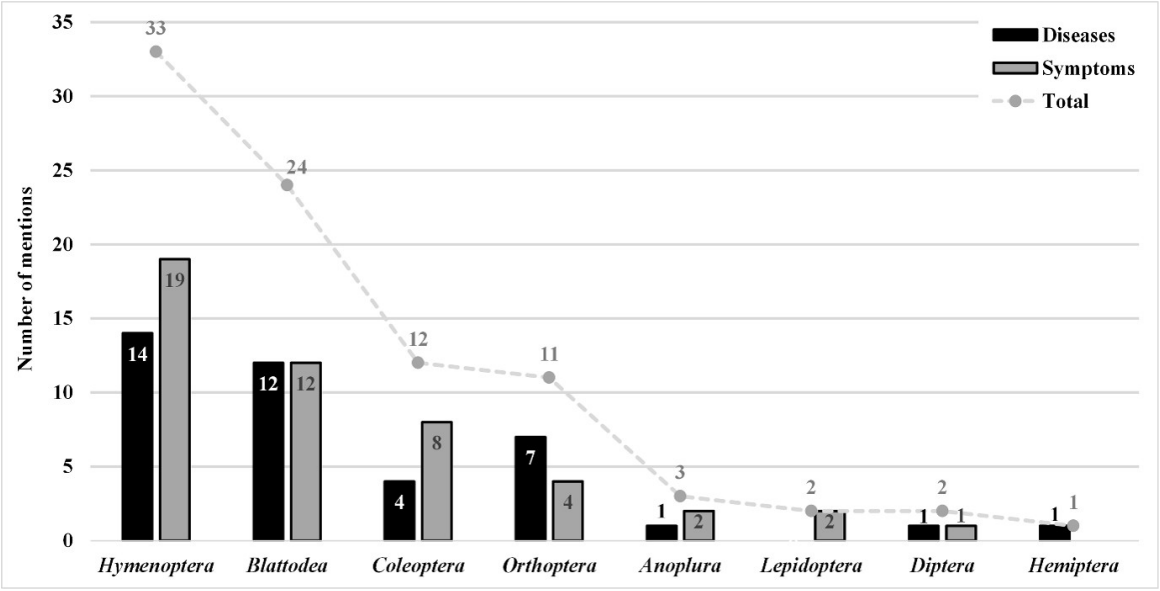


FIGURE 4

Distribution of mentions of therapeutic use by Insecta orders recorded in the 22 studies included in the scoping review. Bars represent the number of uses#mentions classified as treatments for diseases and symptoms, while the dotted line indicates the total number of mentions for each order. Counts are based on use#mentions extracted from the included publications, with each use#mention corresponding to a reported association between an insect and a therapeutic indication. Source: by the authors, 2026.

Figure 5 presents an alluvial diagram summarizing the relationships among the studies included in the review, the insect orders documented, and the health conditions associated with their reported uses. This visualization highlights several important gaps in the existing literature. Notably, some insect orders—such as *Anoplura, Lepidoptera, Diptera* and *Hemiptera*—appear to be underexplored, as they were associated with the fewest mentions. Additionally, most links between insect taxa and health conditions showed low recurrence (n = 1 or n = 2). Rather than indicating limited relevance, this pattern likely reflects the contextual and localized nature of ethnomedical knowledge, which is often transmitted orally and shaped by the lived experiences of specific communities.

The dispersed distribution of records may also stem from differences in methodological approaches, regional emphases, and research objectives across studies. Together, these factors point to a field still in consolidation, in which diverse knowledge systems are documented in a fragmented and heterogeneous manner.

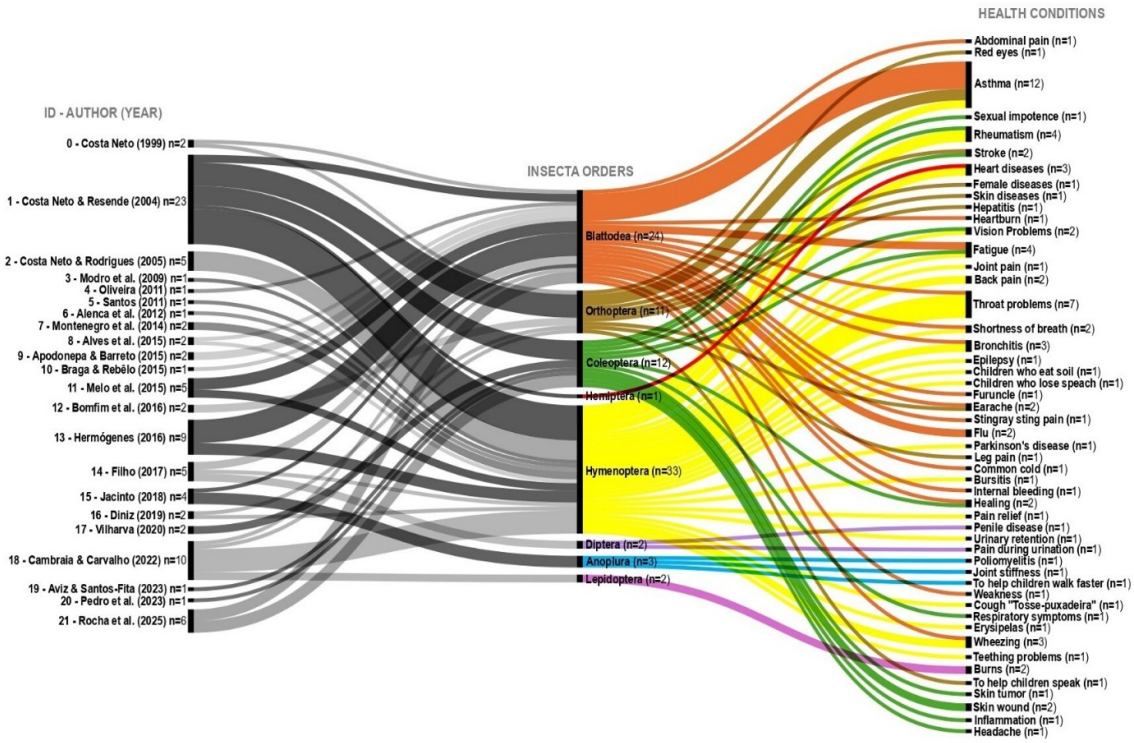


FIGURE 5

Alluvial diagram illustrating the relationships between the included publications, insect orders, and health conditions reported in the 22 Brazilian medical ethnoentomology studies included in the scoping review. The connections represent use#mentions, defined as reported associations between a given insect taxon and a therapeutic indication, as described in the analyzed literature. The width of the flows is proportional to the number of uses#mentions recorded. Diseases and symptoms are presented as reported in the sources, without biomedical reclassification, to preserve emic categories. Source: by the authors, 2026.

Respiratory diseases, particularly asthma and bronchitis, were the most frequent therapeutic contexts (Figure 5), a pattern also reported in earlier ethnoentomological and ethnozoological studies in Brazil (Alves *et al*., 2015; Oliveira, 2011; Costa Neto & Resende, 2004). Throat problems, fatigue, and pain-related symptoms were likewise frequent and appeared across multiple insect orders, suggesting shared cultural interpretations of illness rather than isolated or taxon-specific logics (Cambraia & Carvalho, 2022; Hermógenes, 2016).

This scoping review synthesizes how insect-based therapeutic knowledge has been documented in Brazilian ethnobiological research. It does not evaluate clinical efficacy, effectiveness, toxicity, or safety, nor does it recommend practices. When pharmacological studies are cited, they serve only to situate research trajectories and knowledge dialogues.

As a complementary resource, Table 2 provides a more detailed overview of the relationships identified between insects and the health conditions they are used to treat, including the subdivision of families within each order and their respective forms of use. Among the *Hymenoptera*, bees, ants, and velvet ants were particularly prominent, frequently associated with venom, stings, or whole-insect preparations, and most often linked to respiratory, neurological, and pain-related conditions (Hermógenes, 2016; Melo et al., 2015; Costa Neto & Resende, 2004). The prominence of bees is partially shaped by the institutional recognition of apitherapy within Brazilian integrative health policies (Brasil, 2018; Telesi Júnior, 2016).

Among bees, five vernacular names were recorded, and the use of stingers and venom was associated with the treatment of rheumatism, heart diseases, and Parkinson's disease, mainly for the relief of myalgia-related symptoms such as joint and back pain. Within the scientific community, research on the pharmacological

properties of bee venom is more advanced, with review studies reporting potential anti-inflammatory, contraceptive, and antiarrhythmic effects (Sforcin *et al*., 2022). However, these studies emphasize the need for more conclusive research, particularly controlled and randomized clinical trials, to clarify the efficacy of the compounds involved and possible adverse effects (Silvano *et al*., 2020; Souza & Ruvolo-Takasusuki, 2019).

Among ants, the use of the whole insect or its abdomen was recorded, administered fried or as a tea, for the treatment of asthma, urinary retention, erysipelas, and rheumatism. Among the reported symptoms, throat problems were the most frequently cited (n = 6), followed by vision problems, fatigue, shortness of breath, cough, and back pain. In the scientific literature, the use of ants in health-related applications is still poorly explored (Castro *et al*., 2014; Tanaka *et al*., 2007; Oliveira & Campos-Farinha, 2005).

Regarding wasps, locally known as "oncinhas" and "formiguinhas de ouro" and belonging to the family *Mutillidae*, two mentions were recorded for the treatment of bronchitis and one mention for asthma, epilepsy, wheezing, allophagy in children (soil ingestion), childhood aphasia, and teething problems.

Blattodea, including cockroaches and termites, largely associated with domestic or peridomestic contexts, were reported on the treatment of respiratory and inflammatory conditions. Their frequent documentation underscores the importance of everyday ecological coexistence in shaping ethnoentomological knowledge (Rocha *et al*., 2025; Alves *et al*., 2015; Oliveira, 2011). Termites are treated here as members of *Blattodea* in accordance with current phylogenetic classifications (Grandcolas, Pellens & Constantino, 2024).

For the order *Blattodea*, cockroaches, used whole, in pieces, or as tea, were mainly employed for the treatment of asthma, with three studies referring to this disease. They were also mentioned for the treatment of boils, influenza, colds, and various symptoms such as abdominal pain, earache, fatigue, heartburn, wheezing, weakness, and internal bleeding. Termites, used whole as tea or smoke, were also associated with the treatment of asthma (n = 4), influenza, bronchitis, throat problems, shortness of breath, wound healing, and pain caused by stingray injuries.

ORDER	FAMILY	POPULAR NAMES (Portuguese Version)	FORM USED	DISEASES (Portuguese Version) (Reference)	SYMPTOMS (Portuguese Version) (Reference)
Hymenoptera	*Apidae*	Bee (Abelha, melifera, italiana, europa, capucho e africanizada)	Sting / Venom	Rheumatism (Reumatismo) (Costa Neto & Resende, 2004; Modro *et al.*,2009) Heart diseases (Doenças de coração) (Santos, 2011) Parkinson's disease (Mal de Parkinson) (Melo *et al.*, 2015) Heart diseases (Coração) (Cambraia & Carvalho, 2022)	Joint pain (Dor nas juntas) (Costa Neto & Resende, 2004) Back pain (Dor nas costas) (Costa Neto & Resende, 2004) Pain relief (Alivio de dores) (Hermógenes, 2016)
	Formicidae	Ant (formiga, tanajura, saúva, formiga-jeje, formiga-de-mandioca, formiga doce, formiga de roça, formiga-preta-gigante, formiga-cabeçuda)	Whole / Abdomen / Fried / Tea	Asthma (Asma) (Costa Neto & Resende, 2004) Rheumatism (Reumatismo) (Costa Neto & Resende, 2004) Urinary retention (Retenção urinária) (Filho, 2017) Erysipelas (Erisipela) (Cambraia & Carvalho, 2022)	Throat problems (Problemas de garganta) (Costa Neto & Resende, 2004; Alencar *et al.*,2012; Montenegro *et* al.,2014*; Alves *et al.*, 2015; Melo *et al.*, 2015) Vision problems (Problemas de visão) (Costa Neto & Resende, 2004) Shortness of breath (Falta de ar) (Costa Neto & Resende, 2004) Back pain (Dor nas costas) (Costa Neto & Resende, 2004) Fatigue (Cansaço) (Hermógenes, 2016) Cough ("Tosse-puxadeira") (Diniz, 2019)
	Mutillidae	Velvet-ant (Oncinha, formiguinha de ouro)	Whole	Bronchitis (Bronquite) (Costa Neto & Rodrigues, 2005; Cambraia & Carvalho, 2022) Asthma (Asma) (Costa Neto & Rodrigues, 2005) Epilepsy (Epilepsia) (Costa Neto & Rodrigues, 2005)	Children who eat soil (Criança que come terra) (Costa Neto & Rodrigues, 2005) Children who lose speech (Criança que perde a fala) (Costa Neto & Rodrigues, 2005) Wheezing (Chiado) (Cambraia & Carvalho, 2022*) Teething problems (Dentição) (Cambraia & Carvalho, 2022)
	Vespidae	Wasp (marimbondo)	Sting / Venom	Bursitis (Bursite) (Hermógenes, 2016)	
Blattodea		Cockroach (Barata)	Whole / Pieces / Tea	Asthma (Asma) (Costa Neto & Resende, 2004; Hermógenes, 2016; Filho, 2017) Furuncle (Furúnculo) (Apodonepa & Barreto, 2015) Flu (Gripe) (Hermógenes, 2016) Common cold (Resfriado) (Hermógenes, 2016)	Abdominal pain (Dor de barriga) (Costa Neto, 1999) Heartburn (Azia) (Costa Neto & Resende, 2004) Earache (Dor de ouvido) (Apodonepa & Barreto, 2015) Fatigue (Cansaço) (Hermógenes, 2016; Filho, 2017) Internal bleeding (Hemorragia interna) (Hermógenes, 2016)

TABLE 2

Insect orders, uses, and therapeutic indications (diseases and symptoms) reported in Brazilian medical ethnoentomology studies included in the scoping review.

					Weakness (Fraqueza) (Jacinto, 2018) Wheezing (Chiado) (Cambraia & Carvalho, 2022)
		Termite (Cupim)	Whole / Tea / Smoke	Asthma (Asma) (Oliveira, 2011; Alves *et al.*, 2015; Melo *et al.*, 2015; Rocha *et al.*, 2025) Flu (Gripe) (Melo *et al.*, 2015) Bronchitis (Bronquite) (Rocha *et al.*, 2025)	Stingray sting pain (Dor de ferroada de arraia) (Braga & Rebêlo, 2015) Throat problems (Problemas de garganta) (Melo *et al.*, 2015) Healing (Cicatrização) (Hermógenes, 2016) Shortness of breath (Falta de ar) (Rocha *et al.*, 2025)
Orthoptera		Cricket (Grilo)	Whole / Legs / Tea / Broth	Asthma (Asma) (Costa Neto & Resende, 2004) Female diseases (Doença de mulher) (Costa Neto & Resende, 2004)	Red eyes (Vermelhão no olho) (Costa Neto, 1999) Earache (Dor de ouvido) (Bomfim *et al.*, 2016) Leg pain (Dor nas pernas) (Bomfim *et al.*, 2016) To help children speak (Para criança falar) (Cambraia & Carvalho, 2022)
		Grasshopper (Gafanhoto)	Exoskeleton / Tea	Asthma (Asma) (Costa Neto & Resende, 2004) Skin diseases (Doença de pele) (Costa Neto & Resende, 2004) Stroke (Derrame) (Costa Neto & Resende, 2004) Hepatitis (Hepatite) (Costa Neto & Resende, 2004)	
		Mole cricket (Paquinha-de-telhado)	Whole	Asthma (Asma) (Diniz, 2019)	
Coleoptera	*Tenebrionidae*	Peanut beetle (Besouro-do-amendoim)	Whole	Sexual impotence (Impotência sexual) (Costa Neto & Resende, 2004) Rheumatism (Reumatismo) (Costa Neto & Resende, 2004)	Vision problems (Problemas de visão) (Costa Neto & Resende, 2004)
	Scarabaeidae	Dung beetle (Rola-bosta)	Whole	Stroke (Derrame) (Costa Neto & Resende, 2004)	Fatigue (Cansaço) (Costa Neto & Resende, 2004)
	Chrysomelidae	Tucumã worm (Bicho do tucumã)	Lard / Oil	Skin tumor (Tumor de pele) (Aviz & Santos-Fita, 2023)	Skin wound (Ferimentos) (Rocha *et al.*, 2025) Inflammation (Inflamação) (Rocha *et al.*, 2025 Headache (Dor de cabeça) (Rocha *et al.*, 2025)
	Curculionidae	Palm weevil (Broca-do-coqueiro)	Larva / Oil		Respiratory symptoms (Problemas respiratórios) (Vilharva, 2020) Healing (Cicatrização) (Vilharva, 2020) Skin wound (Feridas de pele) (Pedro *et al.*, 2023)
Anoplura		Louse (Piolho)	Whole / Tea	Poliomyelitis (Paralisia infantil) (Jacinto, 2018)	Joint stiffness (Junta dura) (Jacinto, 2018) To help children walk faster (Criança andar rápido) (Jacinto, 2018)
Lepidoptera		Caterpillar (lagarta)	Whole / Viscera		Burns (Queimadura) (Cambraia & Carvalho, 2022*)
Diptera		Fly (mosca)	Whole / Tea	Penile disease (Doença no pênis) (Filho, 2017)	Pain during urination (Dor de urina) (Filho, 2017)
Hemiptera		Kissing bug (Barbeiro)	Whole	Heart disease (Doença de coração) (Costa Neto & Resende, 2004)	

Source: by the authors, 2026.

Within the order *Orthoptera*, whole crickets or their legs in the form of broth or tea, have been associated with asthma, female diseases, red eyes, earache, leg pain and to help children speak, while the exoskeleton of grasshoppers in the form of tea was used to treat asthma, skin diseases, stroke, and even hepatitis. Finally, asthma has also been linked to whole mole crickets.

Among coleopterans, the whole insect was described for the treatment of sexual impotence, vision problems, rheumatism, stroke, and fatigue, while the larvae/oil were used to combat inflammation, headaches, skin wounds, healing processes, respiratory symptoms, and skin tumors. Seeking to chemically characterize the oil extracted from larvae of *Rhynchophorus palmarum*, used by the Guarani-Kaiowá community for wound healing and treatment of respiratory diseases, Vilharva (2020) demonstrated antioxidant activity and healing potential, with no toxicity observed in in vitro and in vivo models. This finding illustrates how traditional knowledge can stimulate new scientific investigations with potential applications in public health.

Among the less frequently cited insects, lice (*Anoplura*) were described for the treatment of poliomyelitis, joint stiffness, and to help children walk earlier; caterpillar viscera (*Lepidoptera*) were used to treat burns; flies were mentioned for penile diseases and painful urination; and kissing bugs (*Hemiptera*), used whole, were reported for the treatment of heart diseases.

Despite the ethnographic documentation of medicinal insect use in Brazil, this review did not evaluate clinical efficacy or safety outcomes. These findings imply that future research could investigate these practices under controlled laboratory and clinical conditions, including studies on efficacy, toxicity, and safety. Such investigations would be necessary before any consideration of potential applications within formal healthcare contexts, and therefore the practices described here should be understood primarily as elements of traditional knowledge rather than clinically validated therapies.

Overall, some insects have been more extensively investigated by the scientific community, particularly bees and their products, especially venom, whereas other insects such as cockroaches, lice, and flies remain largely unexplored from a pharmacological perspective.

Although the Brazilian Unified Health System (SUS) incorporates certain integrative and complementary practices, their inclusion occurs only after specific regulatory and evaluative processes, albeit with heterogeneous levels of evidence. Nevertheless, this remains a sensitive field, marked by intense debates regarding the boundaries between traditional practices, scientific criteria for validation, and the risk of conferring legitimacy to approaches considered unproven. Within this context, discussions about the therapeutic use of insects require particular caution: it is possible to acknowledge their sociocultural relevance and their value as subjects of investigation without presupposing clinical efficacy or reinforcing interpretations that exceed the scope of available evidence.

It is important to emphasize that traditional knowledge regarding the therapeutic use of insects should be subjected to rigorous laboratory and clinical evaluation to verify its efficacy and safety. The absence of this scientific process may contribute to the dissemination of unverified information and potentially risky practices, as observed during the COVID-19 pandemic, when therapies without scientific evidence were widely promoted (Barcelos *et al*., 2021).

Therefore, this review highlights potential directions for future research, including laboratory and clinical investigations into the possible bioactive compounds of the insect species reported in the literature. Such studies could help clarify which reported uses have pharmacological relevance and which should be understood primarily within their ethnographic and cultural contexts.

Documenting these practices, therefore, raises ethical and epistemological considerations regarding consent, interpretation, and benefit-sharing, themes widely discussed in Brazilian literature on traditional knowledge and biodiversity (Gomes & Lara, 2020; Santos, 2014; Ferreira & Clementino, 2010).

CONCLUSION

This study demonstrates that medical ethnoentomological knowledge in Brazil is documented across 22 scientific publications, involving both traditional and non-traditional communities and a wide diversity of insect taxa, preparation methods, and therapeutic purposes. Our results show that insects are recurrently associated with the treatment of respiratory diseases and the relief of symptoms such as throat problems, fatigue, and shortness of breath, with *Hymenoptera, Blattodea, Coleoptera* and *Orthoptera*, accounting for the majority of reported use-mentions.

While practices involving bee products have received greater attention in experimental research, the majority of ethnographically described uses—particularly those involving cockroaches, termites, ants, and orthopterans—remain poorly investigated under laboratory or clinical conditions. From an ethnobiological perspective, these records should not be interpreted as evidence of biomedical efficacy but rather as expressions of culturally situated knowledge systems shaped by long-term coexistence among human groups, insects, and local ecosystems.

By organizing and critically synthesizing dispersed information, this review highlights important knowledge gaps, including the underrepresentation of several Brazilian regions and the limited documentation of many insect orders. It provides a structured basis for future interdisciplinary research, emphasizing the need to respect ethical frameworks, access and benefit sharing principles, and the epistemological integrity of the communities that sustain this knowledge.

Ethics statement

This study is a review of published and publicly available sources and did not involve new interviews or interaction with human participants. Where reported, ethical approvals and informed consent procedures described in the original studies were recorded; when absent, this is noted as a limitation of the underlying literature.

Conflict of Interest

The authors declare that there are no conflicts of interest related to this study.

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