What do we know about livestock diseases in Ethiopia? A birds-eye view of recent evidence

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The systematic evidence map allows users to quickly take stock of evidence on livestock disease prevalence and mortality. The map reveals the distribution and quantity of available evidence, and highlights areas for further investment and research.

What is the evidence map about and what studies were included?

The purpose of this systematic map was to investigate the current evidence landscape for cattle and small ruminant diseases and mortality in Ethiopia using a systematic approach. Unlike systematic reviews, systematic maps do not answer a specific question, but use the same rigorous methods to collate and describe the available evidence relating to a research question. This evidence is scattered across multiple database, so a wide number of online repositories were searched using keywords, covering the period between 2010 and 2019. Articles were then screened for relevance to the research topic [1]. Study information was extracted from the articles and an excel table captured the following information:

- Publication Details – reference, journal, year of publication and SJR (Scientific Journal Rankings – Q1 indicates the highest impact factor and Q4 the lowest)
- Study Details – start and end date, experimental design and sampling strategy
- Study Area - geographical area covered, agroecology, production system
- Study Population – species, animal breed, age
- Study Outcome – disease prevalence (individual and herd), disease specific mortality
- Study Disease and diagnostics – disease, tissue sample, diagnostic tests

After screening the literature for relevance to the research question, 716 articles were selected for inclusion. These articles described populations of ruminants of all ages and breeds and covered different production systems and geographical regions, while using varying diagnostic tests and samples for disease diagnosis.

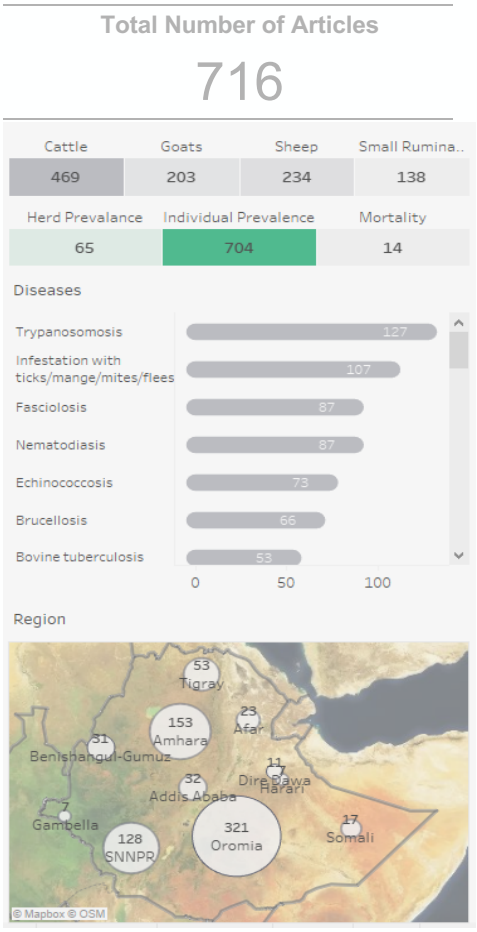

Figure 1: Screenshot of the interactive tool

What does this map reveal?

Table 1 summarises the main findings of the map. The dataset [2] can be explored using an interactive tool, created using Tableau, available at livestockdata.org [3]. Figure 1 shows a screenshot of the tool.

What do these findings tell us?

This systematic map identified evidence gluts and gaps within the disease prevalence and mortality database. It revealed an increased publication output from 2012 to 2017, compared to the period between 2010 to 2011 and 2018 to 2019. Most studies were conducted in Oromia, Amhara and SNNPR regions.

Table 1: The findings obtained within the parameters of the available evidence

Evidence	*Finding*
Publications	• Most articles were published in journals (697 studies), with a few academic theses and conference proceedings. • The Journal of Veterinary Medicine and Animal Health Journal appeared most frequently. • Most studies were published in 2012 (101 studies) and 2017 (97 studies). • For 402 studies the SJR score was not available, 86 studies were published in a journal ranked at Q2.
Study details	• Most studies were cross-sectional observational studies (697 studies).
Study area	• The majority of studies published within Ethiopia concentrated on the Oromia region (321 studies), followed by Amhara (153 studies) and then SNNPR (128 studies).
Study population	• Cattle were the most studied ruminant population (469 studies), followed by sheep (234 studies) and then goats (203 studies).
Study outcome	• Individual prevalence of diseases (704 studies) was studied to a far greater extent than either herd prevalence (65 studies) or mortality (14 studies).
Disease and diagnostic tests	• The most studied disease was trypanosomiasis (127 studies), followed by infestation with ectoparasites (107 studies), then fasciolosis (87 studies). • Microscopy was the most frequently used diagnostic test and serum was the most frequently collected sample.

Figure 2: Abergelle goats in Ethiopia (photo credit: ILRI\Zerihun Sewunet

A substantial body of evidence exists for articles discussing the disease prevalence of trypanosomiasis, ectoparasite infestations, fascioliasis, nematodiariasis, echinococcosis, and brucellosis. Gaps include a relative lack of studies focussing on diseases in small ruminant species (goats and sheep) compared to cattle. The map reveals a number of OIE listed diseases which have been less well-studied. These include bovine genital campylobacteriosis, bovine spongiform encephalopathy, contagious agalactia, enzootic bovine leucosis, leptospirosis, listeriosis, malignant catarrhal fever, ovine epididymitis, paratuberculosis, scrapie and trichomoniasis. These insights could inform the scope for future research for researchers and investors .

These findings suggest that a considerable number of diseases are not well-studied, despite the high output of epidemiological publications. Where evidence is abundant, information should be synthesised to better inform decisions on disease control priorities in the livestock sector. Fewer publications during certain time frames or within certain areas could be attributed to a lack of available resources. By identifying these gaps, our aim is to enable a better understanding of trends and possible areas for further research.

Next Steps

The creation of systematic maps involves the extraction of data from a large number of scientific documents and is therefore ideal for the application of machine learning. SEBI-Livestock is currently working with data scientists to automate the process of finding and extracting evidence from literature, which will considerably speed up the manual process described in this summary [4]. This may allow us to widen the research scope to other geographical areas or other species. This offers the potential to create a live systematic map, as the searches can be re-run a regular basis to update the database.

References

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