***Ministry of Higher Education***

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**Detection of Helminthes Larvae (lung warm) in animal farms by Baermann technique**

***Research present to faculty veterinary medicine university of diyala .which is part of requirement of obtain a bachelor`s degree in medicine and veterinary surgery***

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 **بسم الله الرحمن الرحيم**





 **صدق الله العظيم**

 **الآية(114) من سوره طه**

**الاهداء**

**اهدي هذا العمل المتواضع الى امي التي زودتني بالحنان والمحبه**

**والى اخوتي جميعا والى كل صديق ساندني**

**أقول لهم انتم وهبتموني الحياة والنشاة على شغف الاطلاع والمعرفه**

**شكر وتقدير**

**لا يسعني ان أنجز هذه المرحلةالمهمة من دراستي الا ان**

**أتقدم بجزيل شكري الى**

**كما لا يفوتني ان أتوجه شكري وفائق امتناني الى عمادة كلية**

**الطب البيطري لما بذلوه من جهد ومساعدة في أتمام مستلزمات**

**البحث .**

**كما أتقدم بالشكر والامتنان الى كل من كان عونا لي في انجاز**

**هذه المهمة والله ولي التوقيق .**

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 **Chapter One**

**Introduction:**

Parasitism is the most common way of life; more than 50% of all animal species are parasites. Parasites occur in all animal species and they may have a profound effect on the health of people, domestic animals and wildlife.

The need to control internal parasites will exist as long as cattle are grazing pastures. However, parasite levels are not the same on all pastures or in all cattle. Pastures that are heavily stocked generally have a higher parasite burden than lightly stocked ones. Cattle in a dry lot are less likely to have heavy worm infections than those on pastures. Young cattle will typically have more internal parasites than older cattle. Therefore, the methods of controlling internal parasites should be developed to fit individual production situations. Strategic deworming starts with understanding the life cycle of problem parasites, identifying seasonal changes in parasite burdens and implementing cost effective control. A successful deworming program, along with good overall herd management, will increase milk production in cows and thereby increase weaning weights of calves (1).

Parasitic infections may cause mortality (fetal, neonatal, adult death), morbidity (disease manifest by enteritis, fever, anaemia, etc.), production losses (reduced meat, milk, fibre production), and tissue lesions (reduced marketability of product). Despite many advances in parasite treatment and control, infections still persist due to many factors, including urbanization (crowding together); more intensive farming systems, greater translocation of animals, further land and marine development, inadequate effluent disposal, emergence of parasite drug resistance, and spread of vector insecticide resistance (2).

An intestinal parasite infection is a condition in which a [parasite](https://en.wikipedia.org/wiki/Parasite) infects the [gastro-intestinal tract](https://en.wikipedia.org/wiki/Gastro-intestinal_tract)of humans and other animals. Such parasites can live anywhere in the body, but most prefer the intestinal wall (3). Routes of exposure and infection include ingestion of undercooked meat, drinking infected water, [fecal-oral transmission](https://en.wikipedia.org/wiki/Fecal-oral_transmission) and skin absorption (4).

Some types of [helminths](https://en.wikipedia.org/wiki/Helminths) and [protozoa](https://en.wikipedia.org/wiki/Protozoa) are classified as intestinal parasites that cause infection—those that reside in the [intestines](https://en.wikipedia.org/wiki/Intestines). These infections can damage or sicken the host (humans or other animals). If the intestinal parasite infection is caused by helminths, the infection is called [helminthiasis](https://en.wikipedia.org/wiki/Helminthiasis%22%20%5Co%20%22Helminthiasis) (5).

Infections caused by gastrointestinal parasites are prevalent in cattle because of the suitable climate for the transmission of infection (1,2,3). Parasitic nematodes are one

of the most important causes of production losses in most cattle-producing countries of the world. Losses may involve mortality, reduction in weight gain, retarded growth, and low fertility (4,5). In raising livestock for food production, studies that help in quantifying the economic losses caused by parasitism are important, especially in smallholder farming systems in developing countries (6). As parasites may cause clinical and nonclinical diseases leading to economic losses, the goal of veterinarians and producers is to prevent parasitism through management, nutrition, epidemiology, and effective treatment (7). The nematodes or roundworms constitute the [phylum](https://en.wikipedia.org/wiki/Phylum) Nematoda (also called *Nemathelminthes*)(2,3). They are a diverse animal phylum inhabiting a broad range of environments. Nematode [species](https://en.wikipedia.org/wiki/Species) can be difficult to distinguish, and although over 25,000 have been described(4,5) of which more than half are [parasitic](https://en.wikipedia.org/wiki/Parasitism), it is estimated that over 40,000 species exist; estimates of 500,000 to 1 million species (6) are not supported by evidence (7). Nematodes are classified along with [insects](https://en.wikipedia.org/wiki/Insecta) and other [moulting](https://en.wikipedia.org/wiki/Moulting%22%20%5Co%20%22Moulting) [animals](https://en.wikipedia.org/wiki/Animalia) in the [clade](https://en.wikipedia.org/wiki/Clade) [Ecdysozoa](https://en.wikipedia.org/wiki/Ecdysozoa%22%20%5Co%20%22Ecdysozoa), and, unlike [flatworms](https://en.wikipedia.org/wiki/Platyhelminthe), have tubular [digestive systems](https://en.wikipedia.org/wiki/Digestion) with openings at both ends.

Nematodes have successfully adapted to nearly every [ecosystem](https://en.wikipedia.org/wiki/Ecosystem) from marine (salt water) to fresh water, to soils, and from the polar regions to the tropics, as well as the highest to the lowest of elevations. They are ubiquitous in freshwater, marine, and terrestrial environments, where they often outnumber other animals in both individual and [species](https://en.wikipedia.org/wiki/Species) counts, and are found in locations as diverse as mountains, deserts and [oceanic trenches](https://en.wikipedia.org/wiki/Oceanic_trench). They are found in every part of the earth's [lithosphere](https://en.wikipedia.org/wiki/Lithosphere) (8), even at great depths, 0.9–3.6 km (3,000–12,000 ft), below the surface of the Earth in gold mines in South Africa (9,10,11,12,13). They represent 90% of all animals on the [ocean floor](https://en.wikipedia.org/wiki/Seabed) (14). Their numerical dominance, often exceeding a million individuals per square meter and accounting for about 80% of all individual animals on earth, their diversity of life cycles, and their presence at various trophic levels point at an important role in many ecosystems (15). There are about 2271 [genera](https://en.wikipedia.org/wiki/Genera) in 256 [families](https://en.wikipedia.org/wiki/Family_%28biology%29) (7). The many parasitic forms include [pathogens](https://en.wikipedia.org/wiki/Pathogen) in most plants and animals. A third of the genera occur as [parasites](https://en.wikipedia.org/wiki/Parasite) of [vertebrates](https://en.wikipedia.org/wiki/Vertebrate); about 35 nematode species occur in humans (7).

Parasitic disease in domestic ruminants were directly effect in term of lower productivity (16) During the control and treatment of ruminant's helminthiasis species, age of animal and agroecology should be considered as potential risk factors for the occurrence of the disease (7).

Primary infection to pulmonary parasites causes immune suppressing in lungs and subsequently secondary microbial contamination causes inflammation and bronchopneumonia (18) Demostic animals are commonly effect with hydatid cyst, cysticercus, Fasciola hepatica, *Dictyocaulus filaria* causing considerable economic losses in form of mortality and partial or complete condemnation of the carcasses at the slaughter houses and importance of the disease particularly in rural where more closes association between man and domestic animal (19).

Large ruminants are important domestic animals in tropical livestock production systems (18). They play a great role in food supply, a source of income and foreign currency (20).

However, the economic gains from these animals remain insignificant when it is compared to their huge number. This low productivity is a reflection of disease, limited genetic potential and husbandry standard (21). Helminthes of ruminants are ubiquitous and many tropical and sub-tropical environments in the world provide nearly perfect conditions for their survival and development. Lungworms can result an infection of the lower respiratory tract, usually resulting in verminous bronchitis or verminous pneumonia (22). Lugworms are Protostrong ylids and *D. viviparous*. Protostrongylids are heteroxenous parasites that infect terrestrial mollusks as intermediate host (23) where as *D. viviparous* has a direct life cycle (24). Small and Large ruminant's lungworms with waste and losing of livestock productions cause significant damages (25). *Dictyocaulus viviparous,* cystocaulusocreatus, Protostrongy lusrufescent and Muellerius capillaries are responsible to these damages (26,27).

The aim of this study was assessment of cattle,sheep, goats and horses contamination to lungworms of Baaquba city.

**Chapter Two**

**Review of Literatures**

An infection of the lower respiratory tract, usually resulting in bronchitis or pneumonia, can be caused by any of several parasitic nematodes, including *Dictyocaulus viviparus* in cattle, llamas, and alpacas; *D filaria* in goats, sheep, llamas, and alpacas; *D eckerti* in deer; *D arnfieldi* in donkeys and horses;*Protostrongylus rufescens* and *Muellerius capillaris* in sheep and goats; *Metastrongylus apri*, *M pudendotectus*, and *M salmi* in pigs; *Oslerus osleri*, *Crenosoma vulpis*, and *Eucoleus aerophilus* in dogs; and *Aelurostrongylus abstrusus* and *E aerophilus* in cats. Other lungworm infections occur but are less common (1).

Species of *Dictyocaulus* belong to the superfamily Trichostrongyloidea and have direct life cycles. *E aerophilus* belongs to the Trichuroidea and is thought to have a direct life cycle. The others belong to the Metastrongyloidea and, except for *O osleri*, have indirect life cycles (5).

Some nematodes that inhabit the right ventricle and pulmonary circulation, eg, *Angiostrongylus vasorum* and *Dirofilaria immitis*, both found in dogs in certain areas of the world, may be associated with pulmonary disease. Clinical signs relating to a cardiac or a pulmonary syndrome or to a combination of both may occur (1,2,7).

**Epidemiology:**

Diseases caused by the ruminant *Dictyocaulus* spp are of most economic importance. The cattle lungworm *D viviparus* is common in northwest Europe and is the cause of severe outbreaks of “husk” or “hoose” in young (and more recently, older) grazing cattle (8). The lungworm of goats and sheep, *D filaria*, is comparatively less pathogenic but does cause losses, especially in Mediterranean countries, although it is also recognized as a pathogen in Australia, Europe, and North America. *D filaria* and *D viviparus* are less pathogenic in alpacas and llamas, although severe infections can cause coughing, dyspnea, depression, and loss of condition. *D arnfieldi* can cause severe coughing in horses and, because patency is unusual in horses (but not in donkeys), differential diagnosis with disease due to other respiratory diseases can be difficult. *M capillaris* is prevalent worldwide and, although usually nonpathogenic in sheep, can cause severe signs in goats. Other lungworm infections cause sporadic infections in various animal species in many countries (10).

***Dictyocaulus spp:***

Adult females in the bronchi lay larvated eggs that hatch either in the bronchi (*D viviparus*, *D filaria*) or in host feces (*D arnfieldi*) after being coughed up and swallowed. The infective third-stage larvae can develop on pasture within 5–7 days in warm, moist conditions, but typically in summer in temperate northern climates will require 2–3 wk. Once larvae are infective, transmission depends on their dispersal away from the fecal pats (15, 20,25).

Dispersal mechanisms are, primarily, mechanical and include rain or, in the case of *D viviparus* and possibly *D arnfieldi*, by the sporangia of the fungus *Pilobolus*. A proportion of infective larvae survive on pasture throughout the winter until the following year but, in very cold conditions, most become nonviable. The principal source of new infections each year is from infected carrier animals, with overwintered larvae providing a secondary but not unimportant contribution in some countries (12,14,16).

In the case of *D arnfieldi*, donkeys are the prime source of pasture contamination for horses. Clinical disease in ruminants usually develops on first exposure to sufficient infective larvae; the severity of disease and stimulation of an immune response is related to the number of larvae ingested (28,29).

In cattle and sheep, this usually occurs during their first season at pasture; however, an increase in the number of older cattle affected has been reported and is attributed to the efficiency of some prophylactic anthelmintic regimens, which eliminates infection and prevents development of a protective immune response. Because transmission of infection to horses requires infected donkeys (patent infections rarely occur in adult horses but may occur in foals and yearlings), first infections can occur at any age in that species. Once infected, adult ruminants generally become immune to further disease, but a proportion maintain subclinical infections during which they act as a source of further pasture contamination (25,30).

Occasionally, when previously infected adults or groups that have not been exposed to reinfection for >1 yr, and in which immunity may have waned, are exposed to an overwhelming level of infection, clinical disease may recur. In areas of Europe in which cattle are housed during winter and first grazing season calves turned out in late April or May, the first infections can be seen between mid June and late July, but most severe infections generally occur in previously unexposed calves after development of the second generation of infective larvae on pasture between August and early October (27,29, 31).

***Other Species:***

*Metastrongylus* spp in pigs require an earthworm intermediate host; thus, infection is confined to pigs with access to pasture and may become more common in previously uncommon areas as a result of organic farming methods. *M capillaris* and *P rufescens* in sheep and goats require slugs or snails as intermediate hosts, which must be eaten for infection to occur. *C vulpis* is acquired by dogs through ingestion of an infected terrestrial snail or slug intermediate host.

*A abstrusus* is normally acquired by cats after ingestion of a paratenic host such as a bird or rodent that has previously eaten the infected slug or snail intermediate host. Adults of *O osleri* live in nodules in the trachea of dogs, and larvated eggs laid by adults hatch there (32, 33,34). Larvae migrate up the bronchial tree and may pass in the feces; however, these are not active, are often dead or degenerating, and are not an important route of transmission. Infection in domestic animals is mainly through saliva as the dam cleans her pups.*E aerophilus* in dogs likely has a direct cycle, with larvated eggs being ingested with food or water (35, 36, 37).

**Pathogenesis:**

The pathogenic effect of lungworms depends on their location within the respiratory tract, the number of infective larvae ingested, and the animal’s immune state. During the prepatent phase of *D viviparus* infection, the main lesion is blockage of bronchioles by an infiltrate of eosinophils in response to the developing larvae; this results in obstruction of the airways and collapse of alveoli distal to the block. Clinical signs are moderate unless large numbers of larvae are ingested, in which case the animal may die in the prepatent phase with severe interstitial emphysema and pulmonary edema (38,39,40) .

In the patent phase, the adults in the segmental and lobar bronchi cause a bronchitis, with eosinophils, plasma cells, and lymphocytes in the bronchial wall; a cellular exudate, frothy mucus, and adult nematodes are found in the lumen. The bronchial irritation causes marked coughing, and the entire reaction leads to increased airway resistance (41, 42). A major component of the patent stage is development of a chronic, nonsuppurative, eosinophilic, granulomatous pneumonia in response to eggs and first-stage larvae aspirated into alveoli and bronchioles (43, 44).

This is usually in the caudal lobes of the lungs and is severe when widespread; in combination with the bronchitis, death may result. Interstitial emphysema, pulmonary edema, and secondary bacterial infection are complications that increase the likelihood of death. Survivors may suffer considerable weight loss (45,46).

If the animal survives until the end of patency (2–3 mo for *D viviparus*), most or even all of the adult worms are expelled, and the cellular exudate resolves over the ensuing 4 wk. Most animals recover unless secondary infection develops in the damaged lungs during the postpatent phase (47). In a few animals, clinical signs are exacerbated in the postpatent phase due to development of a diffuse, proliferative alveolitis characterized by hyperplasia of the type II alveolar epithelial cells (48). The cause is unknown, but it is seen much less often in cattle treated with anthelmintics with a persistent action against *D viviparus* such as the macrocyclic lactones ivermectin, doramectin, eprinomectin, and moxidectin (49).

*D filaria* is similar to *D viviparus*, but interstitial emphysema is not a common complication. Bronchial lesions predominate in *D arnfieldi*infections; when an alveolar reaction occurs, as in donkeys or foals, there are lobular areas of overinflation due to intermittent obstruction of small bronchi (36, 39, 45).

The pathogenic effect of the other lungworms has a similar basis, but frequently such severe clinical signs are not produced, perhaps because of a more restricted localization in the lungs and less severe infections. The patent phase and the associated lesions last >4 mo for some lungworms (*M apri* and *A abstrusus*) but can be >2 yr (*M capillaris*) 50,51,53).

The lesions in pigs with metastrongylosis are a combination of localized bronchitis and bronchiolitis with overinflation of related alveoli, usually at the tips and midway along the diaphragmatic lobes (15, 34, 36).

Associated with the mass of nematodes in the lumen is hypertrophy and hyperplasia of bronchiolar and alveolar duct smooth muscle with marked mucous cell hyperplasia (54). Near the end of the patent period (as adult worms are killed), gray-green lymphoid nodules (2–4 mm) are formed; fragments of dead worms may be seen microscopically in these nodules composed of lymphocytes and plasma cells surrounding a central zone of eosinophils (55).

In *M capillaris* and *P rufescens* infections, chronic, eosinophilic, granulomatous pneumonia seems to predominate; the reaction is in the bronchioles and alveoli that contain the parasites, their eggs, or larvae (12, 17).

They are surrounded by macrophages, giant cells, eosinophils, and other immunoinflammatory cells, which produce gray or beige plaques (1–2 cm) subpleurally in the dorsal border of the caudal lung lobes (56). Small (1–2 mm), greenish, nodular lesions may also develop. The effect of these lesions in sheep is minor, perhaps because of the predominantly subpleural location. This infection represents the lower end of the pathogenic spectrum for lungworms (22, 25, 35).

In cats, *A abstrusus* produces nodular areas of granulomatous pneumonia in the caudal lobes that, if sufficiently generalized, can be clinically significant and occasionally fatal; a notable feature is the hypertrophy and hyperplasia of the smooth muscle in the media of pulmonary arteries and arterioles. The nodules of *O osleri*, found in the mucous membrane of the trachea and large bronchi, can produce extreme airway irritation and persistent coughing. *C vulpis* infections result in chronic bronchitis and bronchiolitis, which leads to chronic coughing. *E aerophilus*infections in dogs are usually well tolerated but may cause chronic tracheitis and bronchitis (57, 58).

In adult animals not previously exposed to infection, the lesions and pathogenesis are the same as in young animals. However, in adults with some degree of immunity, reexposure to the parasite (eg, husk in adult cattle) can result in different lesions. Despite the immune response, many larvae reach the lungs before they are killed in the terminal bronchioles and alveoli (34, 45, 54).

Larvae not killed in the terminal bronchioles may reach the bronchi and cause a bronchitis characterized by marked eosinophilic infiltration of the bronchial walls and greenish yellow exudate in the lumen comprising eosinophils, other inflammatory cells, and parasitic debris. The reaction associated with this process can lead to severe clinical signs if the nodules are numerous and the eosinophilic bronchitis extensive; this is responsible for the reinfection phenomenon 47,59).

**Clinical Findings:**

Signs of lungworm infection range from moderate coughing with slightly increased respiratory rates to severe persistent coughing and respiratory distress and even failure. Reduced weight gains, reduced milk yields, and weight loss accompany many infections in cattle, sheep, and goats. Patent subclinical infections can occur in all species 33,44,45).

The most consistent signs in cattle are tachypnea and coughing. Initially, rapid, shallow breathing is accompanied by a cough that is exacerbated by exercise. Respiratory difficulty may ensue, and heavily infected animals stand with their heads stretched forward and mouths open and drool. The animals become anorectic and rapidly lose condition. Lung sounds are particularly prominent at the bronchial bifurcation. In adult dairy cattle, milk yield drops severely, and abnormal lung sounds are heard over the caudal lobes. The reinfection phenomenon in adult dairy cattle is usually seen in the fall; although less severe than in initial infections, the signs are widespread coughing and tachypnea and a marked drop in milk yield (22,24,54).

The signs in llamas, alpacas, sheep, and goats infected with *D filaria* are similar to those in cattle. Pulmonary signs usually are not associated with *M capillaris* or *P rufescens* in sheep, but the former can affect goats similarly to *D filaria*. *D arnfieldi* is associated with coughing, tachypnea, and unthriftiness in older horses but with few if any signs in foals or donkeys (18, 22,34).

The main clinical sign of metastrongylosis in pigs is a persistent cough that may become paroxysmal. Coughing and dyspnea occur with *A abstrusus* infections in cats and *O osleri* or *C vulpis* infections in dogs. Fatalities are relatively uncommon with these lungworms, although they do occur in kittens (56).

**Diagnosis:**

Diagnosis is based on clinical signs, epidemiology, presence of first-stage larvae in feces, and necropsy of animals in the same herd or flock. Bronchoscopy and radiography may be helpful. Larvae are not found in the feces of animals in the prepatent or postpatent phases and usually not in the reinfection phenomenon (*D viviparus*). ELISA tests are available in some countries (55, 57).

The test is mainly of use in detecting cattle that have not been exposed, rather than as a differential diagnostic tool in acute respiratory disease. In the early stages of an outbreak, larvae may be few in number. First-stage larvae or larvated eggs can be recovered using most fecal flotation techniques with the appropriate salt solutions; however, larvae will crenate if allowed to sit for a long time on the slide before examination, making identification difficult. Bronchial lavage can reveal *D arnfieldi* infections in horses (17,19,21).

A convenient method to recover larvae is a modification of the Baermann technique, in which large fecal samples (25–30 g) are wrapped in tissue paper or cheese cloth and suspended or placed in water contained in a beaker. The water at the bottom of the beaker is examined for larvae after 4 hr; in heavy infections, larvae may be present within 30 min (19, 21,23).

In domestic pets, detection of first-stage larvae in the feces, either on flotation or with the Baermann technique, is still the diagnostic technique of choice. However, in dogs, cats, and horses, because of the relative infrequency of infection in many areas, lungworms may be considered only after failure of antibiotic therapy to ameliorate the condition. Adults of *Dictyocaulus* spp and *M apri* are readily visible in the bronchi during the patent phases of infection. However, examination of smears from bronchial mucus or histologic sections from lesions may be necessary to confirm the diagnosis during other stages of lungworm infection (and also for other lungworms) (25,27,29).

Bronchoscopy can be used to detect nodules of *O osleri* or to collect tracheal washings (dogs and horses) to examine for eggs, larvae, and eosinophils.





**Nodules of Oslerus osleri , bronchoscopy**

Courtesy of Ontario Veterinary College.

Necropsy should include examination of the trachea, particularly at the bifurcation, for *O osleri* and the lesions they induce.

**Treatment:**

Several drugs are useful to treat lungworms (see Table: [Recommended Treatments for Lungworms a](https://www.msdvetmanual.com/respiratory-system/lungworm-infection/overview-of-lungworm-infection#v3293073)). The benzimidazoles (fenbendazole, oxfendazole, and albendazole) and macrocyclic lactones (ivermectin, doramectin, eprinomectin, and moxidectin) are frequently used in cattle and are effective against all stages of *D viviparous (22, 24, 34)*.

These drugs are also effective against lungworms in sheep, horses, and pigs. Levamisole is used in cattle, sheep, and goats, but treatment may need to be repeated 2 wk later because it is less effective against larvae during the early stages (34,56).

Topical formulations containing moxidectin, selamectin, or emodepside and oral fenbendazole have been used successfully in cats for *A abstrusus*. *O osleri* in dogs is a problem, but there is evidence that fenbendazole and ivermectin are effective if treatment is prolonged (fenbendazole). Injectible doramectin along with removal of as many nodules as possible is the current treatment of choice. *E aerophilus*in dogs and cats is similarly difficult to treat, but success has been reported with ivermectin, fenbendazole, or selamectin (56,58).

**Recommended Treatments for Lungworms a**

| **Parasite** | **Host** | **Treatment** |
| --- | --- | --- |
| *Dictyocaulus viviparus* | Cattle | Ivermectin, doramectin, moxidectin, eprinomectin, fenbendazole, albendazole, levamisole |
| *D filaria* | Sheep, goat | Ivermectin, doramectin, moxidectin, eprinomectin, fenbendazole, albendazole, levamisole |
| *D arnfieldi* | Horse, donkey | Ivermectin, moxidectin |
| *Metastrongylus*spp | Pig | Ivermectin, doramectin, moxidectin, fenbendazole, levamisole |
| *Aelurostrongylus abstrusus* | Cat | Fenbendazole, emodepside, moxidectin, selamectin |
| *Oslerus osleri* | Dog | Fenbendazole, ivermectin, doramectin |
| *Eucoleus aerophilus* | Dog, cat | Fenbendazole (dog), selamectin (cat)b |
| *Crenosoma vulpis* | Dog | Febantel, fenbendazole, milbemycin oxime, moxidectin |
| a In severe cases, NSAIDs may also be helpful. |
| b Anecdotal evidence for efficacy but no published evidence or label recommendations. |

Animals at pasture should be moved off infected pasture, and supportive therapy may be needed for complications that can arise in all species (33,55).

**Control:**

Lungworm infections in herds or flocks are controlled primarily by vaccination or anthelmintics. Oral vaccines are available in Europe for *D viviparus* (northeastern areas) and *D filaria* (southeast). Two doses of irradiated infective larvae are given 4 wk apart, with the second dose given at least 2 wk before the start of grazing or exposure to probable infection. Used properly, they prevent clinical disease, but some vaccinated animals may become mildly infected to the extent that larvae are excreted and perpetuate further infection (16,18,34,56).

Anthelmintic prophylaxis has become feasible with the advent of anthelmintics with prolonged activity (eg, ivermectin, doramectin, moxidectin, eprinomectin). With persistent anthelmintics, two or three treatments during the grazing season, the timing of which depends on local grazing practice and epidemiology, are effective and may, by disrupting developing infections, stimulate immunity to the parasite. The use of multiple treatments may delay immunity to *D viviparus* until the animal is adult, when infection (albeit usually less severe) can occur. However, these methods have become popular in that GI parasites are controlled simultaneously (45,55,60).

Other more sporadic infections can be controlled more easily by management, eg, avoidance of grazing horses with donkeys, indoor husbandry of pigs, and by not mixing sheep and goats on the same grazing (61).

 **Chapter Three**

**Materials and Methods:**

The study conducted in clinic-college of veterinary medicine university of Diyala-Iraq;the fecal samplea were collected from the animals by Directed method from the rectum by introduce the hand into the anus using gloves and lubricant . the gastrointestinal parasites are diagnostic by method Baermann Technique:

Place adouble layer of cheesecloth on disposable paper towel ,using aspoon or spatula weigh or measure approximately 5-10 grams of fecal material. Place the fecal material in the centre of the cheesecloth.

Form a pouch contining the facal material by holding the four corners of the cheesecloth together and moulding the cloth around the faecal material.

Using a rubber band or length of string close cheesecloth pouch .push the stick or short metal rod under the rubber band or string so that the pouch can be suspended, place the pouch containing the facal material in the funnel .trim off the excess cheececloth ,fill the funnel with lukewarm water.make sure the faecal material is covered.

Learve the apparatus to stand for 24 hours , drawoff a few milliliter of fluid form the stem of the funnel into a test tube . learve to sediment for at least 30 minutes.use a Pasteur pipette to transfer a small droplet of the sedimented fluid from the test tube to microscope slide .add drop of iodine to fix the larvae and gently place a cover slip over the drop. And examin under compound microscope at 10 x 10 magnification. When larvae areactively motile,add alcohol to kill them for easier examination.

**Baermann Tachnique**

 This technique is a modification of the Berlese Apparatus used by entomologists to collect insects from plant material and soil. It is used to retrieve nematode larvae from feces, soil, plant matter or other organic material. The Baermann Technique operates on the principle that the nematode larvae wiggle out of the biological material, cannot swim against gravity and will fall through the water to the area of clamped off tubing. The clamp is released to collect the larvae for identification. Any fecal sample submitted for this procedure must be freshly voided so that the sample is not contaminated by free-living nematodes.

The Baermann Technique is not recommended as a primary diagnostic technique for evaluation of parasites in feces. It is not useful for those nematode larvae that do not leave the feces or other biological material, or for detection of parasite eggs or cysts that may be in the fecal sample. Some lungworm larvae are retrieved using this technique, but some larvae such as those of *Filaroides hirthi, Filaroides osleri*, *Strongyloides*sp*.* and *Dictyocaulus* sp. are better recovered using flotation techniques. Lungworms, such as *Eucoleus*(*Capillaria) aerophilus*, that do not produce larvae are detected only by using flotation methods as well.

**Materiale:**

|  |  |
| --- | --- |
| * Funnel – size according to need
* Funnel stand
* Rubber or plastic tubing
* Clamp or spring clip
* Cheesecloth or dental napkin
* Thin stick or metal rod
* Strainer
* Microscope
* Test tube
 | * Pasteur pipette
* Small petri dishes
* Scissors
* Disposable paper towels
* Spoon or spatula
* Rubber band or length of string
* Jug or flask
* Microscope slides and coverslips
* Iodine
 |

**Chapter Four**

**Results and Discussion:**

 Collection 50 fecal sample from animals in the farm of college of veterinary medicine University of diyala-iraq.these results were achieved as follow:

Of(50)fecal sample, 3 cases were infacted by Dictyocaulus viviparous, Of(50) total samples fecal ,9 cases were infacted by Dictyocaulus filaria, and There is no cases infected by *Dictyocaulus arufelid.*

The highest infection rate recorded in febuary ,moderate infaction in march and No infection in April (table2).

**Table (1) Shows number of collected samples according to animal species and sex**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Month | Cattle samples | Sheep samples | Goat samples | Horse samples | Total samples |
| male | female | male | female | male | female | male | female |
| February | 5 | 2 | 3 | 1 | 4 | 2 | 2 | 1 | 20 |
| March | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 1 | 15 |
| April | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 15 |

**Table (2): Show type and number of parasites in cattle, sheep, goat and horse**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **months** | **Total number examined** | **No.of positive cases** | **Dictyocaulus viviparous in cattle** | **Dictyocaulus filaria in sheep**  | **Dictyocaulus filaria in gout**  | **Dictyocaulus arnfeldi in horse** |
| 2\2018 | 20 | 8 | 2 | 4 | 2 | 0 |
| 3\2018 | 15 | 4 | 1 | 2 | 1 | 0 |
| 4\2018 | 15 | 0 | 0 | 0 | 0 | 0 |


 fig(.1) Dictyocaulus



 fig.(2) Dictyocaulus viviparous



 fig.(3) Dictyocaulus filaria

**Discussion:**

*Dictyocaulosis* in cattle is widely present in temperate and subtropical areas. It is very common in regions with a moist temperate with mild climate and high rainfall

Many researcher (26, 27, 28) confirmed the presence of Lungworm infection(*D. viviparus*) in dairy cattle farms in tropical highlands of Tanzania. This infection is also recognized in certain areas of Ethiopia and Kenya in areas characterized by high altitudes (29). An analysis of variance of the study results showed that the disease is significantly present in high altitude region of Tabriz city with a high rainfall and the prevalence varies depending on the altitude and age.

The present study revealed the presence of nematode species parasitizing the respiratory tract of small ruminants that causes bronchitis and pneumonia with an overall infection rate of 15.5% by coproscopic examination and this disagree with(30) that was (0.2%). The present study explain the appear larva in the fecal sample and confirmed by the investigation of the adult lungworm in the lung. Prevalence rate relatively high for this should be control measures. This study is the first one about the lungworm in small ruminants. In this study prevalence rate was15.5% in the small ruminants and this disagree with prevalence rate 26.7% in Ethiopia (31) and the deference may be due to the change in the environmental conditions.

The epidemiology of helminthes diseases complex involves a balance between the infection rate and the resistance of the host. Accordingly in both temperate and tropical areas, young animals are particularly liable to develop heavy infection. However, there is a marked difference in the seasonal incidence of the disease between those tropical areas in which the climate includes a long hot and dry season and those in which the dry season is short or absent (45, 56,61).

**References**

1. Hodda, M (2011). "Phylum Nematoda Cobb, 1932. In: Zhang, Z.-Q. (Ed.) Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness". Zootaxa. **3148**: 63–95.
2. Zhang, Z (2013). "Animal biodiversity: An update of classification and diversity in 2013. In: Zhang, Z.-Q. (Ed.) Animal Biodiversity: An Outline of Higher-level Classification and Survey of Taxonomic Richness (Addenda 2013)". Zootaxa. **3703** (1): 5–11. [doi](https://en.wikipedia.org/wiki/Digital_object_identifier):[10.11646/zootaxa.3703.1.3](https://doi.org/10.11646/zootaxa.3703.1.3).
3. Lambshead PJD (1993). "Recent developments in marine benthic biodiversity research". Oceanis. **19** (6): 5–24.
4. Borgonie G, García-Moyano A, Litthauer D, Bert W, Bester A, van Heerden E, Möller C, Erasmus M, Onstott TC (June 2011). "Nematoda from the terrestrial deep subsurface of South Africa". Nature. **474** (7349): 79 -82
5. Bhanoo SN (2011-06-01). ["Nematode found in mine is first subsurface multicellular organism"](https://www.nytimes.com/2011/06/07/science/07obworm.html?_r=1&ref=southafrica). The New York Times. [ISSN](https://en.wikipedia.org/wiki/International_Standard_Serial_Number) [0362-4331](https://www.worldcat.org/issn/0362-4331). Retrieved 2011-06-13.
6. Borgonie G, García-Moyano A, Litthauer D, Bert W, Bester A, van Heerden E, Möller C, Erasmus M, Onstott TC (2011-06-02). "Nematoda from the terrestrial deep subsurface of South Africa". Nature. **474** (7349): 79 82. [doi](https://en.wikipedia.org/wiki/Digital_object_identifier):[10.1038/nature09974](https://doi.org/10.1038/nature09974). [ISSN](https://en.wikipedia.org/wiki/International_Standard_Serial_Number) [0028-0836](https://www.worldcat.org/issn/0028-0836). [PMID](https://en.wikipedia.org/wiki/PubMed_Identifier) [21637257](https://www.ncbi.nlm.nih.gov/pubmed/21637257)
7. Danovaro R, Gambi C, Dell'Anno A, Corinaldesi C, Fraschetti S, Vanreusel A, Vincx M, Gooday AJ (January 2008). "Exponential decline of deep-sea ecosystem functioning linked to benthic biodiversity loss". Curr. Biol. **18** (1): 1–8. [doi](https://en.wikipedia.org/wiki/Digital_object_identifier):[10.1016/j.cub.2007.11.056](https://doi.org/10.1016/j.cub.2007.11.056). [PMID](https://en.wikipedia.org/wiki/PubMed_Identifier) [18164201](https://www.ncbi.nlm.nih.gov/pubmed/18164201). [Lay summary](http://www.eurekalert.org/pub_releases/2007-12/cp-dsl122007.php) – EurekAlert!.
8. Platt HM (1994). "foreword". In Lorenzen S, Lorenzen SA. The phylogenetic systematics of freeliving nematodes. London: The Ray Society. [ISBN](https://en.wikipedia.org/wiki/International_Standard_Book_Number) [0-903874-22-9](https://en.wikipedia.org/wiki/Special%3ABookSources/0-903874-22-9).
9. [Cobb, Nathan](https://en.wikipedia.org/wiki/Nathan_Cobb) (1914). "Nematodes and their relationships". [Yearbook United States Department of Agriculture](http://naldc.nal.usda.gov/catalog/IND43748196). [United States Department of Agriculture](https://en.wikipedia.org/wiki/United_States_Department_of_Agriculture). pp. 457–90. Quote on p. 472.
10. Chitwood BG (1957). ["The English word "Nema" Revised"](http://plpnemweb.ucdavis.edu/Nemaplex/General/Phylumname.htm). Systematic Zoology in Nematology Newsletter. **4** (45): 1619. [doi](https://en.wikipedia.org/wiki/Digital_object_identifier):[10.2307/sysbio/6.4.184](https://doi.org/10.2307/sysbio/6.4.184).
11. Siddiqi MR (2000). Tylenchida: parasites of plants and insects. Wallingford, Oxon, UK: CABI Pub. [ISBN](https://en.wikipedia.org/wiki/International_Standard_Book_Number) [0-85199-202-1](https://en.wikipedia.org/wiki/Special%3ABookSources/0-85199-202-1).
12. Schmidt-Rhaesa, A. (2014). Gastrotricha, Cycloneuralia and Gnathifera: General History and Phylogeny. In: Schmidt-Rhaesa, A. (ed.). Handbook of Zoology (founded by W. Kükenthal); Gastrotricha, Cycloneuralia and Gnathifera; Vol 1, Nematomorpha, Priapulida, Kinorhyncha, Loricifera. de Gruyter: Berlin-Boston.
13. Cobb, N. A. (1919). The orders and classes of nemas. Contrib. Sci. Nematol. 8: 213–216, [[1]](https://www.biodiversitylibrary.org/part/58037).
14. Chitwood BG, Chitwood MB (1933). "The characters of a protonematode". J Parasitol. **20**: 130.
15. Chitwood BG (1937). "A revised classification of the Nematoda". Papers on Helminthology published in commemoration of the 30 year Jubileum of ... K.J. Skrjabin... Moscow: All-Union Lenin Academy of Agricultural Sciences. pp. 67–79.
16. Chitwood BG (1958). ["The designation of official names for higher taxa of invertebrates"](https://www.biodiversitylibrary.org/part/19410#/summary). Bull Zool Nomencl. **15**: 860–95. [doi](https://en.wikipedia.org/wiki/Digital_object_identifier):[10.5962/bhl.part.19410](https://doi.org/10.5962/bhl.part.19410).
17. Coghlan, A. (7 Sep 2005). ["Nematode genome evolution"](http://www.wormbook.org/chapters/www_genomevol/genomevol.pdf) (PDF). WormBook. The C. elegans Research Community. [doi](https://en.wikipedia.org/wiki/Digital_object_identifier):[10.1895/wormbook.1.15.1](https://doi.org/10.1895/wormbook.1.15.1). Retrieved 13 January 2016.
18. Blaxter ML, De Ley P, Garey JR, Liu LX, Scheldeman P, Vierstraete A, Vanfleteren JR, Mackey LY, Dorris M, Frisse LM, Vida JT, Thomas WK (March 1998). "A molecular evolutionary framework for the phylum Nematoda". Nature. **392** (6671): 71–5. [doi](https://en.wikipedia.org/wiki/Digital_object_identifier):[10.1038/32160](https://doi.org/10.1038/32160). [PMID](https://en.wikipedia.org/wiki/PubMed_Identifier) [9510248](https://www.ncbi.nlm.nih.gov/pubmed/9510248).
19. ["Nematoda"](http://tolweb.org/Nematoda/2472/2002.01.01). Tree of Life Web Project. [Tree of Life Web Project](https://en.wikipedia.org/wiki/Tree_of_Life_Web_Project). 2002. Retrieved 2008-11-02.
20. Holterman M, van der Wurff A, van den Elsen S, van Megen H, Bongers T, Holovachov O, Bakker J, Helder J (2006). "Phylum-wide analysis of SSU rDNA reveals deep phylogenetic relationships among nematodes and accelerated evolution toward crown Clades". Mol Biol Evol. **23** (9): 1792–1800. [doi](https://en.wikipedia.org/wiki/Digital_object_identifier):[10.1093/molbev/msl044](https://doi.org/10.1093/molbev/msl044). [PMID](https://en.wikipedia.org/wiki/PubMed_Identifier) [16790472](https://www.ncbi.nlm.nih.gov/pubmed/16790472).
21. Liu, GH; Shao, R; Li, JY; Zhou, DH; Li, H; Zhu, XQ (2013). ["The complete mitochondrial genomes of three parasitic nematodes of birds: a unique gene order and insights into nematode phylogeny"](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3693896). BMC Genomics. **14** (1): 414. [doi](https://en.wikipedia.org/wiki/Digital_object_identifier):[10.1186/1471-2164-14-414](https://doi.org/10.1186/1471-2164-14-414). [PMC](https://en.wikipedia.org/wiki/PubMed_Central) [3693896](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3693896) . [PMID](https://en.wikipedia.org/wiki/PubMed_Identifier) [23800363](https://www.ncbi.nlm.nih.gov/pubmed/23800363).
22. Nyle C. Brady & Ray R. Weil (2009). Elements of the Nature and Properties of Soils (3rd ed.). Prentice Hall. [ISBN](https://en.wikipedia.org/wiki/International_Standard_Book_Number) [9780135014332](https://en.wikipedia.org/wiki/Special%3ABookSources/9780135014332).
23. Ruppert EE, Fox RS, Barnes RD (2004). Invertebrate Zoology: A Functional Evolutionary Approach (7th ed.). Belmont, California: Brooks/Cole. [ISBN](https://en.wikipedia.org/wiki/International_Standard_Book_Number) [978-0-03-025982-1](https://en.wikipedia.org/wiki/Special%3ABookSources/978-0-03-025982-1).
24. Weischer B, Brown DJ (2000). An Introduction to Nematodes: General Nematology. Sofia, Bulgaria: Pensoft. pp. 75–76. [ISBN](https://en.wikipedia.org/wiki/International_Standard_Book_Number) [978-954-642-087-9](https://en.wikipedia.org/wiki/Special%3ABookSources/978-954-642-087-9).
25. Kavlie, RG; Kernan, MJ; Eberl, DF (May 2010). ["Hearing in Drosophila requires TilB, a conserved protein associated with ciliary motility"](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2870953). Genetics. **185**: 177–88. [doi](https://en.wikipedia.org/wiki/Digital_object_identifier):[10.1534/genetics.110.114009](https://doi.org/10.1534/genetics.110.114009). [PMC](https://en.wikipedia.org/wiki/PubMed_Central) [2870953](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2870953) . [PMID](https://en.wikipedia.org/wiki/PubMed_Identifier) [20215474](https://www.ncbi.nlm.nih.gov/pubmed/20215474).
26. Lalošević, V.; Lalošević, D.; Capo, I.; Simin, V.; Galfi, A.; Traversa, D. (2013). ["High infection rate of zoonotic Eucoleus aerophilus infection in foxes from Serbia"](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3718516). Parasite. **20**: 3. [doi](https://en.wikipedia.org/wiki/Digital_object_identifier):[10.1051/parasite/2012003](https://doi.org/10.1051/parasite/2012003). [PMC](https://en.wikipedia.org/wiki/PubMed_Central) [3718516](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3718516) . [PMID](https://en.wikipedia.org/wiki/PubMed_Identifier) [23340229](https://www.ncbi.nlm.nih.gov/pubmed/23340229).
27. Johnigk SA, Ehlers RU (1999). "Endotokia matricida in hermaphrodites of Heterorhabditis spp. and the effect of the food supply". Nematology. **1** (7–8): 717–726. [doi](https://en.wikipedia.org/wiki/Digital_object_identifier):[10.1163/156854199508748](https://doi.org/10.1163/156854199508748). [ISSN](https://en.wikipedia.org/wiki/International_Standard_Serial_Number) [1388-5545](https://www.worldcat.org/issn/1388-5545).
28. Yanoviak SP, Kaspari M, Dudley R, Poinar G (April 2008). "Parasite-induced fruit mimicry in a tropical canopy ant". Am. Nat. **171** (4): 536–44. [doi](https://en.wikipedia.org/wiki/Digital_object_identifier):[10.1086/528968](https://doi.org/10.1086/528968). [PMID](https://en.wikipedia.org/wiki/PubMed_Identifier) [18279076](https://www.ncbi.nlm.nih.gov/pubmed/18279076).
29. Batra, Suzanne W. T. (1965-10-01). "Organisms Associated with Lasioglossum zephyrum (Hymenoptera: Halictidae)". Journal of the Kansas Entomological Society. **38** (4): 367–389. [JSTOR](https://en.wikipedia.org/wiki/JSTOR) [25083474](https://www.jstor.org/stable/25083474).
30. Purcell M, Johnson MW, Lebeck LM, Hara AH (1992). "Biological Control of Helicoverpa zea (Lepidoptera: Noctuidae) with Steinernema carpocapsae (Rhabditida: Steinernematidae) in Corn Used as a Trap Crop". Environmental Entomology. **21** (6): 1441–1447. [doi](https://en.wikipedia.org/wiki/Digital_object_identifier):[10.1093/ee/21.6.1441](https://doi.org/10.1093/ee/21.6.1441).
31. Riotte L (1975). Secrets of companion planting for successful gardening. p. 7.
32. Loothfar R, Tony S (2005-03-22). ["Suppression of root knot nematode (Meloidogyne javanica) after incorporation of Indian mustard cv. Nemfix as green manure and seed meal in vineyards"](http://www.publish.csiro.au/paper/AP04081). [Australasian Plant Pathology](https://en.wikipedia.org/wiki/Australasian_Plant_Pathology). CSIRO Publishing. **34** (1): 77–83. [doi](https://en.wikipedia.org/wiki/Digital_object_identifier):[10.1071/AP04081](https://doi.org/10.1071/AP04081). Retrieved 2010-06-14.
33. Pramer C (1964). "Nematode-trapping fungi". Science. **144** (3617): 382–388. [doi](https://en.wikipedia.org/wiki/Digital_object_identifier):[10.1126/science.144.3617.382](https://doi.org/10.1126/science.144.3617.382). [PMID](https://en.wikipedia.org/wiki/PubMed_Identifier) [14169325](https://www.ncbi.nlm.nih.gov/pubmed/14169325).
34. Hauser JT (December 1985). ["Nematode-trapping fungi"](http://www.carnivorousplants.org/cpn/articles/CPNv14n1p8_11.pdf) (PDF). Carnivorous Plant Newsletter. **14** (1): 8–11.
35. Ahrén D, Ursing BM, Tunlid A (1998). "Phylogeny of nematode-trapping fungi based on 18S rDNA sequences". FEMS Microbiology Letters. **158** (2): 179–184. [doi](https://en.wikipedia.org/wiki/Digital_object_identifier):[10.1016/s0378-1097(97)00519-3](https://doi.org/10.1016/s0378-1097%2897%2900519-3). [PMID](https://en.wikipedia.org/wiki/PubMed_Identifier) [9465391](https://www.ncbi.nlm.nih.gov/pubmed/9465391).
36. Szewczyk, Nathaniel J.; Mancinelli, Rocco L.; McLamb, William; Reed, David; Blumberg, Baruch S.; Conley, Catharine A. (December 2005). ["Caenorhabditis elegans Survives Atmospheric Breakup of STS–107, Space Shuttle Columbia"](https://dx.doi.org/10.1089/ast.2005.5.690). Astrobiology. **5** (6): 690–705. [Bibcode](https://en.wikipedia.org/wiki/Bibcode):[2005AsBio...5..690S](http://adsabs.harvard.edu/abs/2005AsBio...5..690S). [doi](https://en.wikipedia.org/wiki/Digital_object_identifier):[10.1089/ast.2005.5.690](https://doi.org/10.1089/ast.2005.5.690). [PMID](https://en.wikipedia.org/wiki/PubMed_Identifier) [16379525](https://www.ncbi.nlm.nih.gov/pubmed/16379525). Retrieved 12 January 2016.
37. Ahmed L.M. and Rasheed, S.A. 2013. Distribu on of liver and lung helminthic infections among slaughtered animals in Kirkuk abattoir. J. Genet. Environ. Resour. Conserv., 1(1), 36-40.
38. Bin Kobir, Md.H.; Eliyas, M.; Abul Hashem, Md.; Mohiuddin, and Miazi, O.F. 2010. Prevalence of zoonotic parasitic disease of domestic animals in different abattoirs of comilla and brahman baria region in Bangladesh University. J. Zool. Rajshahi, 28, 21-25
39. Dagnachew, S. 2011. Epidemiology of gastrointestinal helminthiasis of small ruminants in selected sites of North Gondar zone, Northwest Ethiopia. Ethiop. Vet. J., 15: 57-68.
40. Garedaghi, Y.; Rezaii, A.P.; Naghizadeh, S.A. and Nazeri, M. 2011**.** Survey on Prevalence of Sheep and Goats Lungworms in Tabriz Abattoir, Iran. J. Anim. Vet. Adva., 10(11): 1460-1461.
41. Sykes, A.R. 1994. Parasi sm and produc on in farm ruminant's. Anim Prod. 59: 155-172.
42. Rich, K.M. and Perry, B.D. 2010. The economic and poverty impacts of animal diseases in developing countries: New roles, new demands for economics and epidemiology. Preven. Vet. Med., 101(3-4): 133-147.
43. Islami, A. 1999. Veterinary Helminthology. Second ed., Tehran University publication, Iran.
44. Eerola U., Härtel H., Oksanen A., Sover R. (2010). Gastrointestinal helminths and lungworms in suckler cow beef herds in Southern Finland, a pilot study. Acta Vet Scand (Suppl 1): S28.
45. Eslami, A. (1999). Veterinary Helminthology, 2nd Edn. Tehran University Publications, Iran.
46. Etminani, A. (1980). Veterinary Respiratory Diseases.Tehran University Publications, Iran.
47. Garedaghi Y. (2011). Prevalence of Linguatula serrata Nymph in Goat in Tabriz, North-West of Iran. V R F. 2011; **2**(2): 129 -133.
48. Garedaghi Y., Rezaii saber A.P., Naghizadeh A. and Nazeri M. (2011). Survey on prevalence of sheep and goats lungworms in Tabriz abattoir, Iran. Journal of animal and veterinary advances; **10**(11): 1460-1461.
49. Gorski, P., Niznikowski, R., Popielarczyk, D., Strzelec, E., Gajewska, A. and Wedrychowicz, H., (2004). Natural parasitic infections in various breeds of sheep in Poland. Arch. Tierz.; **47**, 50-55.
50. Gorski, P., Niznikowski, R., Strzelec, E., Popielarczyk, D., Gajewaska, A. and Wedrychowicz, H., 2004). Prevalence of protozoan and helminthes internal parasite infections in goat and sheep flocks in (Poland. Arch.Tierz.; **47**, 43-49.
51. Imari, A.J., (1962). Pulmonary Hydatid Disease in Iraq. The American Society of Tropical in sheep in Kirikkale, Turkey. Acta Veterinarian Hungarica; **51**(2), 181-187.
52. Kadir M.A., Rasheed S.A., (2008). Prevalence of some parasitic helminths among slaughtered ruminants in Kirkuk slaughter house, Kirkuk, Iraq. Iraqi Journal of Veterinary Sciences
53. Maraqa, A., (2005). An Abattoir Survey of Liver and Lung Helminthic Infections in Local Medicine and Hygiene; **11**(4): 481-490.
54. Nematollahi, A. and Moghaddam, Gh., (2009). A survey on annual infestation of sheepwith lungworms based on fecal test and slaughter house study in Tabriz, J. Vet. Res., **64**(4): 339-342.
55. Ploeger H.W. and Holzhauer M. (2012) Failure to eradicate the lungworm Dictyocaulusviviparus on dairy farms by a single mass-treatment before turnout. Vet Parasitol **185**: 335-338. doi: 10.1016/j.vetpar.2011.10.026.
56. Sami, K.A., Fadwa M.A. and Ihsan, M.S., (1984). Further studies on prevalence of hydatidosis in slaughtered animals from North Jordan. Parasitology Research; **72**(1), 89-96.
57. Soulsby E.J.L. Helminths, Arthropods and Pro-tozoa of Demestocated Animals, 7th ed. Bailliere Tindall, London. 1982; 497-498.
58. Tajik H., Tavassoli M., Dalirnaghadeh B., Danehloipour M. (2006). Mesenteric lymph nodes infection with Linguatulaserrata nymphs in cattle. Iranian J Vet Res., **7**(4)17: 82-85.
59. Tavakoli H., Bayat M., Kousha A. (2007). Hydatidosis Infection Study in Human and Livestock Populations During 2002-2007. Am-Eurasian J Agri Environ Sci., **4**: 473-7.
60. Uriarte, J., Cabaret, J. and Tanco J.A., (1985). The distribution and abundance of parasitic. Vet. Res.; **16**(4), 321-325.
61. Yildiz, K. and Gurcan, S., (2003). Prevalence of hydatidosis and fertility of hydatid cystsin sheep in Kirikkale, Turkey. Acta Veterinarian Hungarica; **51**(2), 181-187.

**الخلاصة :**

شملت الدراسه جمع 50 عينه من براز الحيوانات الحقليه منها (16)عينة براز ابقار و (12)عينة براز غنم و(15)عينة براز ماعز و(7)عينة براز حصان من بداية شهر شباط وحتى نهاية شهر نيسان وتم فحص العينات للبحث عن يرقات الديدان الرئوية في حيوانات الحقل .

وقد تبين نتيجة الفحص مايلي :

الاصابة حسب فصول السنة :ان اعلى نسبة اصابة في شهر شباط ,والنسبة المتوسطة في شهر أذار ,بينما لا توجد اصابه في شهر نيسان

**Summary:**

The study spend collected (50) fecal samples from animals in the farm of college of veterinary medicine University of Diyala-Iraq. Of which (16) fecal samples from cows, (12)fecal samples from sheep, (15) fecal samples from goats, and (7) fecal samples from horses during a period from February to April .have been examined and these samples to look for larvae of lung worms in farm animals.

Test result showed the following:

The infection for the seasons: The highest rate infection in February , moderate infection in March and No infection in April