Mastitis is among the most important diseases in dairy animals with worldwide distribution contributing to reduced milk production and major economic losses. A range of physical and chemical changes in the milk and pathological changes in the glandular tissue characterizes mastitis. The disease is multifactorial and from epidemiological and pathophysiological standpoint, the pathogens are regarded as contagious, teat and skin opportunists (Radostits et al., 2007). The present study was conducted to estimate the antibiotic susceptibility of bacterial isolates from bovine mastitis in lactating cows from Aizawl town of Mizoram.

Materials and Methods
The study was carried out in one institutional and four private small holders’ dairy herds of 40 cows in Aizawl, Mizoram. The farm owners reported udder affections and lowered milk yield in single or multiple animals. Relevant information about the farm, breed and age and reproduction history of each animal was recorded. All the cows were examined clinically to detect clinical mastitis and California mastitis test was performed to detect sub-clinical mastitis.

The udders of all the cows were examined visually and by palpation for presence of signs of clinical mastitis like cardinal signs of inflammation, symmetry, size and consistency of udder quarters and abnormalities in milk. Milk samples with CMT score of 1-3 were considered as sub-clinical mastitis. The risk factors considered were age, parity, stage of lactation, breed, previous record of mastitis, floor type and bedding and season. 76 quarter milk samples from 19 mastitic cows were collected aseptically in sterilized screw capped glass vials for bacteriological examination. The milk samples were inoculated to nutrient agar and macaque lactose agar and subsequently inoculated to specific media for pure culture of bacterial isolates. The pure cultures of bacterial isolates were further subjected for identification and confirmation. The staining and cellular morphological features of organisms were ascertained by microscopic examination of gram stained smears. The bacterial isolates were identified on the basis of cultural, morphological and biochemical characteristics (Quinn et al. 1999).

Antimicrobial susceptibility testing for 8 different antimicrobials namely gentamicin (10mcg), penicillin G (10units), tetracycline (10mcg), co-trimoxazole (25mcg), cloxacillin (5mcg), chloramphenicol (30mcg), amoxicillin-clavulanic acid (20/10mcg) and enrofloxacin (5mcg) was done by employing standard disc diffusion method and the interpretation was made as per the zone size interpretation chart provided by the manufacturer of discs.

Results and Discussion
Out of 160 quarters of 40 lactating cows examined for mastitis, 72 (45.00%) quarters from 19 cows (47.50%) were found mastitic; 28 (17.50%) quarters from 7 (17.50%) cows were of clinical mastitis and 44 (27.50%) quarters from 12 (30.00%) cows were of sub clinical mastitis. Most of the affected cows with mastitis had all their four quarters affected (72 out of 76). The incidence of mastitis was higher in the present finding as the study included the dairy herds with complaint of udder affections and lowered milk yield. Sori et al (2005) observed the overall mastitis prevalence as 52.78% with 16.11% clinical and 36.67% sub-clinical cases. Bhatt et al (2011) reported lower prevalence of mastitis as 5.5% and 15.75% in clinical and subclinical cases, respectively.
Analysis of associated risk factors revealed higher incidence (61.11%) of mastitis in cows of 3rd-6th lactation; 27.78% clinical and 33.33% sub clinical mastitis. Cows mostly in their early and mid lactation, within first 6 months, suffered from mastitis (53.13%); 18.75% clinical mastitis and 34.38% sub clinical mastitis. Age wise incidence was higher in 6-8 years age group (66.67%) with 27.78% clinical and 38.89% sub clinical mastitis followed by 3-5 years and 8 years above. Breed predisposition showed higher incidence in 6-8 years age group (66.67%) with 21.88% clinical and 38.89% subclinical mastitis than native cattle (12.50%). Tufani et al. (2012) also reported the breed wise prevalence of 61.90%, 31.75% and 6.35% in Crossbred Jersey, Crossbred Holstein Friesian and Zebu Hill cows, respectively. Seasonally, incidence of mastitis was found higher in rainy (37.50%) (March - August) than dry (10.00%) (September - February) with 17.50% clinical and 20.00% sub clinical mastitis. Wages et al (1999) and Reddy and Sayeed (2009) observed that native breed was least affected and the incidence was highest in summer and lowest in winter. They revealed that 5-8 years old cattle were more affected than 2-4 years. Clinical and sub clinical mastitis of 20.00% and 53.33%, respectively with overall mastitis of 73.33% were recorded in cows with previous history of mastitis. Cows kept in moist wooden/muddy floor had higher incidence (60.00%) of mastitis than concrete floor (35.00%) with 25.00% clinical and 35.00% sub clinical mastitis. Similar findings of higher incidence (74.20%) of mastitis on muddy floor was reported by Benta and Hatamu (2011).

107 bacterial isolates were recovered from 19 mastitic cows. The most frequent bacterial isolates were coagulase positive Staphylococcus aureus (49.53%) followed by Escherichia coli (28.03%), coagulase negative Staphylococci (16.82%) and Bacillus spp (5.61%) with 14.95, 6.54, 5.61, 2.80 and 34.58, 21.50, 11.21, 2.80 percent in clinical and sub clinical mastitis, respectively. Gram-positive Staphylococci were most prominent organisms in clinical and subclinical mastitis followed by the environmental pathogen like E. coli, which occurred as mixed infection with Staphylococcus aureus. The higher prevalence of Staphylococcus aureus in mastitis might explain the presence of these organisms on the skin and mucous membranes of animal body and its contagious nature and prolonged survival in the environment. Reddy and Sayeed (loc. cit) also found that Staphylococcus aureus was the predominant mastitis organisms followed by Escherichia coli. Similar findings of higher incidence of Staphylococcus species were also reported by Kumar and Sharma (2002) and Sudhakar et al (2009). Barbudhe et al (2001) and Kumar and Sharma (2002) reported lower incidence of Escherichia coli in mastitis.

The bacterial isolates recovered from clinical and subclinical mastitis showed variable results in antibiotic sensitivity pattern. Amongst Staphylococcus aureus isolates, 100% sensitivity was recorded to gentamicin and 86.95% to enrofloxacin followed by chloramphenicol (82.60%), amoxy – clav (77.36%), co trimoxazole (71.70%), tetracycline (66.00%), cloxacillin (66.00%) and resistant to penicillin G. Sumathi et al (2008) reported 90% sensitivity to gentamicin and 88.00% sensitivity to enrofloxacin. Zahid (2004), Khan et al (2005) and Hussain et al (2012) reported gentamicin as most sensitive antibiotic against mastitic pathogens. Sudhakar et al. (loc. cit) also reported 100% sensitivity to enrofloxacin while Bhatt et al (loc cit) reported that Staphylococcus was least sensitive to amoxicillin and penicillin G. However, changing pattern of antibiotic susceptibility to Staphylococcus aureus from place to place depends on the extent of antibiotic used.

Although the dairy holders complained about the clinical mastitis in the farms, incidence of sub clinical mastitis was found nearly two times higher than clinical mastitis, which resulted in markedly lowered milk production leading to great economic loss to the budding dairy industry in the state. Sub clinical mastitis went un noticed and in turn resulted in clinical form causing more economic loss incurred by decreased milk production, cost of treatment, veterinarians fee etc. Antibiotic resistance is a major concern due to instantaneous use of antibiotics leading to more treatment cost, withdrawal period and residues in milk.
Summary
The study was conducted to assess the incidence, associated risk factors, major bacterial pathogens and antimicrobial susceptibility with occurrence of mastitis in cows from Aizawl town, Mizoram. The prevalence of mastitis varied with age, parity, stage of lactation, breed, season, previous record of mastitis and type of floor. A total of 107 bacterial isolates from 76 milk samples from 19 mastitis cows (47.50%) were recovered, predominantly *Staphylococcus aureus* (49.53%) followed by *Escherichia coli* (28.04%), coagulase negative *Staphylococci* (16.82%) and *Bacillus* spp (5.61%). *Staphylococcus aureus* was 100% susceptible to gentamicin and resistant to Penicillin G.

References

Carcass Traits of Crossbred Pigs Maintained on Water Hyacinth Incorporated Feed

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High cost, inadequate and inconsistent supply of conventional feed ingredients severely constrained the profitability of pig farming in the north eastern region of India. Hence, the need to assess the potential of non-conventional feed ingredient such as water hyacinth (*Eichhornia crassipes*) in formulation of low cost pig ration is valuable. It has good feed quality when used as a supplement to feeds rich in protein for animal (Abo Bakr *et al.*, 1984). *Men et al.* (2002) also reported that benefits are higher when water hyacinth is fed to pig. The proximate composition of water hyacinth was found to be almost similar

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