





reports on the type of insects pest, time of occurrence, duration of the pest occurs, level of severity in which the insects attach the plant etc. Persistence and a long-term commitment are required for prickly pear control. Unmanaged, smaller populations may quickly expand and become more difficult to eradicate if early control measures are not taken. There are different management options of cactus pear which include physical, cultural methods, chemical, biological and manual methods (USDA, 2012).

## 6. Conclusion

Generally, cactus pear (Beles) is important for the livelihood of Tigray people as sources of income, direct consumption and soil and water conservation. However, there are challenges like less attention of researchers and thus an availability of improved varieties of cactus pear and newly introduced pests like cochineal insects. Therefore, it is must to collect and improve the available germplasm of the crop, applying proper agronomic practices and controlling these pests.

## References

- [1] Badii M. and Adriana E. Flores, 2008. Prickly Pear Cacti Pests and Their Control in Mexico, *Florida Entomologist* 84(4).
- [2] Barbera, G., 1995. History, economic and agro-ecological importance. In: Agro-ecology, cultivation and uses of cactus pear. Eds. Barbera, G., Inglese, P. & Pimienta-Barríos, E. (eds.) FAO Plant production and protection paper 132:1-12.
- [3] Ben Salem, H., Nefzaoui, A. and Ben Salem, L., 2002. Nitrogen supplementation improves the nutritive value of *Opuntia ficus-indica* F. *inermis* – based diets and sheep growth. Eds. Nefzaoui, & Inglese, P. Proceedings of the 4th International Congress on Cactus Pear and Cochineal. *Acta Horticulturae* 581, 317-321.
- [4] Brutsch, M.O., 1997. The Beles or Cactus Pear (*Opuntia ficus-indica*) in Tigray, Ethiopia. *J. PACD* 2:130-141 Department of Agronomy, Faculty of Agriculture University of Fort Hare
- [5] Fessehaaye, D., 2010. Cactus - based development in Tigray and experience from Mexico. *Cactusnet newsletter. Special Issue* 12. Pp 22-30.
- [6] Firew, T., 2007. Evaluation of alternative feed resources for ruminants under arid zones of the tropics and subtropics: The case of cactus pear (*Opuntia ficus indica*) in Ethiopia. Ph.D Thesis, Humboldt University of Berlin, Germany.
- [7] Gebremeskel, G., Getachew A. and Firew T., 2013. Assessment of the potential of cactus pear (*Opuntia ficus indica*) as livestock feed in Northern Ethiopia, *livestock research for rural development* 25(2).
- [8] Giuseppe, D. B., 2010. Strengthening Cactus Pear production in Tigray and North Wollo. *Cactusnet newsletter. Special Issue* 12. pp 17-21
- [9] Griffith, M.P., 2004. The origins of an important cactus crop, *Opuntia ficus-indica* (Cactaceae): New molecular evidence. *Amer. J. Bot.* 91(11): 1915–1921.
- [10] Habtu, L., 2005. Cactus in southern Tigray: Current status, potential uses, utilization and threat. M.Sc. Thesis, Addis Ababa University.
- [11] Kibra, K., 1992. Agro-ecological constraints and the role of cactus pear on household food availability. M.Sc. Thesis, Agricultural University of Norway.
- [12] Mitku, H. Tesfay B. and Zimmerman, H.G., 2002. Current and potential use of cactus pear in Tigray, Northern Ethiopia. In: *Proceeding of IVth International Congress on Cactus Pear and Cochineal*. pp. 75-86. (Nefzaoui, A. and Inglese, P. eds.). *Acta Hort.* 581, ISHS, Hammamet, Tunisia.
- [13] Nefzaoui, A., Inglese P and Belay T., 2010. Improved utilization of cactus pear for food, feed, soil and water conservation and other products in Africa (Eds). *Proceedings of International Workshop*, 19- 21 October 2009. Mekelle, Ethiopia, pp. 224
- [14] Neumann, L., 1997 Opening speech. In: *Proceedings of the International Workshop on "Opuntia in Ethiopia: State of Knowledge in Opuntia Research"* February 23-27, 1997, Mekelle University, Ethiopia and Wiesbaden Polytechnic, Germany, pp 5-9
- [15] Nobel, P.S. and E. Bobich, G., 2002. Environmental biology. pp 57-64. In: Nobel P.S. (ed.). *CACTI Biology and uses*. University of Berkley, Los-Angeles, California.
- [16] Nobel, P.S. 1988. *Environmental biology of agaves and cacti*. New York: Cambridge Univ. Press.
- [17] Padulosi, S., 1998. Criteria for priority setting in initiatives dealing with underutilized crops in Europe. Paper presented at the European Symposium on Plant Genetic Resources for Food and Agriculture, Braunschweig, Germany, 29 June-5 July 1998.
- [18] SAERT (Sustainable Agriculture and Environmental Rehabilitation in Tigray), 1994. Cactus fruit development project survey report. Mekelle, Ethiopia.
- [19] Snyman, H.A., 2006. Root distribution with changes in distance and depth of two-year old cactus pears *Opuntia ficus-indica* and *Opuntia robusta* plants. *South African Journal of Botany, Volume* 72, pp. 434-441
- [20] Stintzing F C and Carle R., 2005. Cactus stems (*Opuntia* species): a review on their chemistry, technology, and uses. *Molecular Nutrition and Food Research*, Volume 49, pp. 175–194
- [21] Tesfay, B. Mulugeta, G. and Tadesse, A. 2011. Description of cactus pear (*Opuntia ficus-indica* (L) mill.) cultivars from Tigray, northern Ethiopia. Research report No. 1. Tigray Agricultural Research Institute, Mekelle, Tigray, Ethiopia.
- [22] Ting, L.P. 1985. Crassulacean acid metabolism. *Ann. Rev. Plant Physiol.*, 36: 595-622.
- [23] United States Department of Agriculture (USDA) 2012, *Field Guide for Managing Prickly Pear in the Southwest*. 12 PP.
- [24] Velásquez, E. 1998. *El nopal y su historia*. Editorial Clío, Mexico