

Evaluation of the Mythic 18 haematology analyzer for its use in cats, dogs and horses



Waßmuth A., Riond B., Hofmann-Lehmann R., Lutz H.
Clinical Laboratory, Vetsuisse Faculty, University of Zurich, Switzerland

Background

The Mythic 18 is a fully automated haematology bench-top analyzer using impedance technology for a complete blood count and a 3-part white blood cell differential (lymphocytes, monocytes, granulocytes).

Objectives:

The purpose of this study was to evaluate the Mythic 18 for its agreement with reference methods, precision, linearity, carry-over and stability.

Material and Methods:

EDTA-blood samples from 122 dogs, 140 cats and 123 horses were analysed with the Mythic and reference methods (Sysmex XT-2000iV, manual haematocrit and microscopic WBC differentiation). Feline platelet results of the Mythic were compared with the optical platelet results of the Sysmex XT-2000iV. Pearson's coefficient of correlation, Passing-Bablok regression analysis and Bland Altman difference plots were performed to determine agreement of the Mythic 18 for each parameter and species. For precision analysis, SD and CV were calculated.

Results:

RBC parameters showed excellent correlation and small biases in all tested species. Moderate correlation was found for MCHC and RDW. Total WBC count correlated excellently in canine and equine samples, and very well in feline samples. In 23 feline specimens with platelet aggregates, the Mythic overestimated WBC counts. In all three species absolute granulocyte counts correlated excellently with the manual WBC differential and the Sysmex XT-2000iV differential. Equine lymphocyte counts showed good correlation, whereas canine and feline lymphocyte counts correlated poorly. Feline platelets showed good correlation with a negative bias. Canine and equine platelet counts showed good correlation with biases that were not of clinical relevance. The instrument showed good to excellent precision.

Conclusion

In conclusion, the Mythic 18 performed excellent for the CBC parameters in all investigated species. The 3-part differential is accurate in horses. In dogs and cats absolute granulocyte counts are reliable. As with all impedance based haematological instruments, a microscopically blood smear evaluation is indicated to identify platelet aggregates and to verify WBC differentiation.

Table 1: Clinical relevance of the Mythic 18 results that deviate from those of the reference methods

Parameter	Species	Correctly recognized samples		Not correctly recognized samples	
		< reference range (<)	> reference range (>)	False positive (<)	False positive (>)
WBC	Cat	1/4	39/48	3	9
	Dog	2/2	60/61	-	3
	Horse	9/9	50/53	-	3
LYM (absolute)	Cat	11/31	3/5	-	18
	Dog	6/24	6/8	5	18
	Horse	8/13	14/16	1	6
GRAN (absolute)	Cat	2/3	30/40	2	3
	Dog	-	57/58	-	2
	Horse	5/6	6/8	2	1
RBC	Cat	32/35	7/7	-	-
	Dog	45/51	7/8	-	2
	Horse	18/20	19/20	2	-
HCT	Cat	54/58	3/3	2	-
	Dog	59/60	2/4	4	-
	Horse	21/21	10/12	4	-
PLT	Cat	19/24	1/1	13	-
	Dog	13/17	22/22	-	8
	Horse	9/12	15/20	9	11

References:

- Knoll, J.S., Rowell, S.L., 1996. Clinical hematology. In-clinic analysis, quality control, reference values, and system selection. *Vet Clin North Am Small Anim Pract* 26, 981-1002.
- Lilliehöök, I., Tvedten, H., 2009a. Validation of the Sysmex XT-2000iV hematology system for dogs, cats, and horses. I. Erythrocytes, platelets, and total leukocyte counts. *Vet Clin Pathol* 38, 163-174.
- Lilliehöök, I., Tvedten, H., 2009b. Validation of the Sysmex XT-2000iV hematology system for dogs, cats, and horses. II. Differential leukocyte counts. *Vet Clin Pathol* 38, 175-182.
- Becker, M., Moritz, A., Giger, U., 2008. Comparative clinical study of canine and feline total blood cell count results with seven in-clinic and two commercial laboratory hematology analyzers. *Vet Clin Pathol* 37, 373-384.
- Weissenbacher, S., Riond, B., Hofmann-Lehmann, R., Lutz, H., (2010). Evaluation of a novel haematology analyser for use with feline blood. *Vet J* doi:10.1016/j.tvjl.2010.01.005.

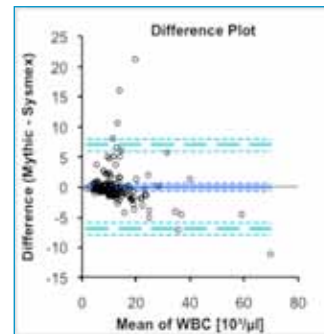


Figure 1: Feline WBC

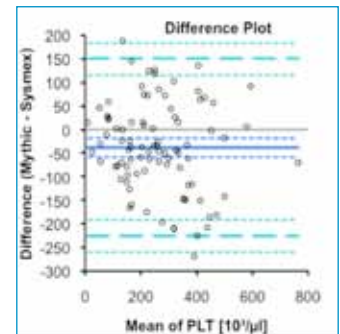


Figure 2: Feline PLT

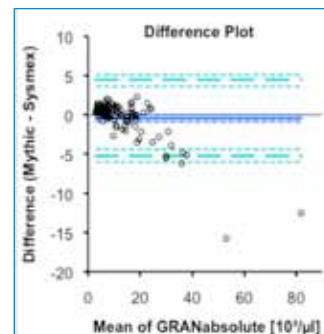


Figure 3: Canine GRAN

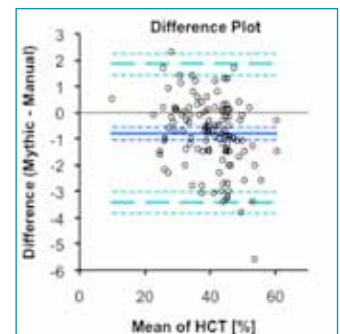


Figure 4: Canine HCT

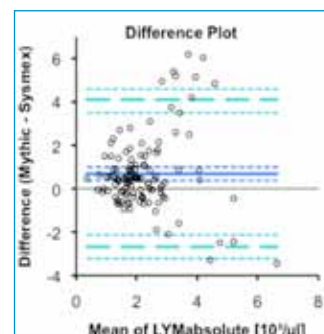


Figure 5: Canine LYM

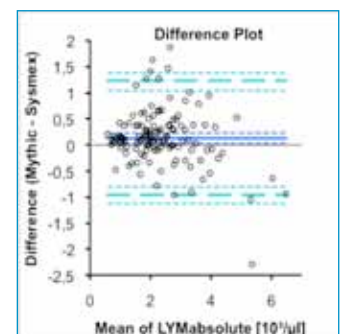


Figure 6: Equine LYM

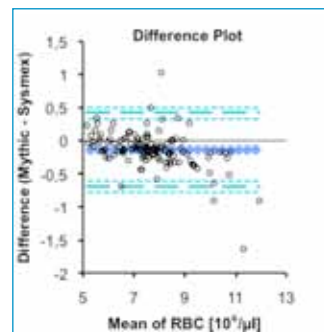


Figure 7: Equine RBC

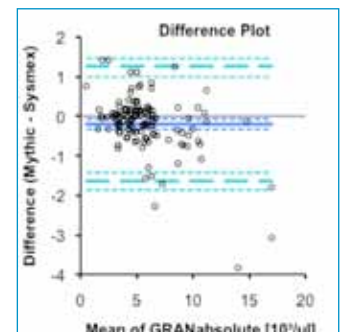


Figure 8: Equine GRAN

Figure 1-8: Comparison of the Mythic 18 with the Sysmex XT-2000iV resp. manual haematocrit. In Bland-Altman-difference plots the thin horizontal line (0 at the y-axis) is the line of identity, the thick dark blue line indicates the bias (mean difference between methods), with their confidence intervals as thin dashed lines. The thick dashed blue horizontal lines are the 95% limits of agreement with their 95% confidence intervals.



Figure 9: Mythic 18 (Orphée SA, Geneva, Switzerland)