

ACKNOWLEDGMENTS

My sincere gratitude to Prof. Dr. Pablo Vidal Torrado, my adviser, to incentive, support, trust, knowledge transmitted, friendship and above all for the patience.

I am very grateful also to Dr^a Judith Schellekens by teaching and knowledge transmitted, great collaboration, suggestions, trust, friendship and patience.

I would like to thank the Graduate Program in Soils and Plant Nutrition and the Soil Science Department from ESALQ/USP for the opportunity of taking the course and for the availability of the facilities, resources and materials for the development of my research work.

I thank CAPES for regular master scholarship at the beginning.

I thank by regular master scholarship grant #2015/03577-2, Sao Paulo Research Foundation (FAPESP).

Thanks Dr. Jaime Antônio de Almeida, Dr. Márcia Regina Calegari and Dr. Plínio Barbosa de Camargo for teachings and laboratory analysis.

Thanks to my friends of the graduate program Danilo, Gabriel Nuto, Lucas, Karina, Ana Bárbara, Sara, Murilo, Beatriz and those already concluded Rodrigo, Josiane, Jairo, Gabriel, Raphael, Pedro, Marina, Taís, José Ricardo, Alexandre by collaboration, fellowship, laughter and incentives.

Thanks to my friend's house (Virginetes) for the friendship, knowledge, parties and incentive.

Thanks to teachers of the Soil Science Department - ESALQ/USP by the knowledge transmitted and contribution to my education.

I thank Luiz Silva, Nivanda, Sônia, Chiquinho, Leandro and Rossi the technicians of the Soil Science Department - ESALQ/USP for the attention and support in laboratory analyses.