



## **Tarangire Lion Project**

### **PROGRESS REPORT**

**May 2005**

## **Background**

The Tarangire Park experiences a marked seasonal wildlife migration. During the rain season, most of the large herbivores migrate into dispersal areas in adjacent villages outside the park, which are the primary calving grounds for most herbivores. Most lions follow the migratory herbivores into dispersal areas. For many years, there had not been serious conflicts between wildlife conservation and pastoralism as traditionally practiced by the Maasai because of low human population density in these areas. However, over the past two decades there has been a rapid increase in human population mainly due to immigration with consequent change in land use leading to expansion of agriculture and human settlement. This has resulted into blockage of some migratory routes, habitat fragmentation and created more opportunities for human-wildlife conflicts. This poses increasing threat to wildlife conservation in the Tarangire-Manyara ecosystem.

This report presents preliminary result on the demography, seasonal range-use, and the extent and impact of the human-lion conflicts in areas outside Tarangire over the 2003-2005 period.

## **Methods**

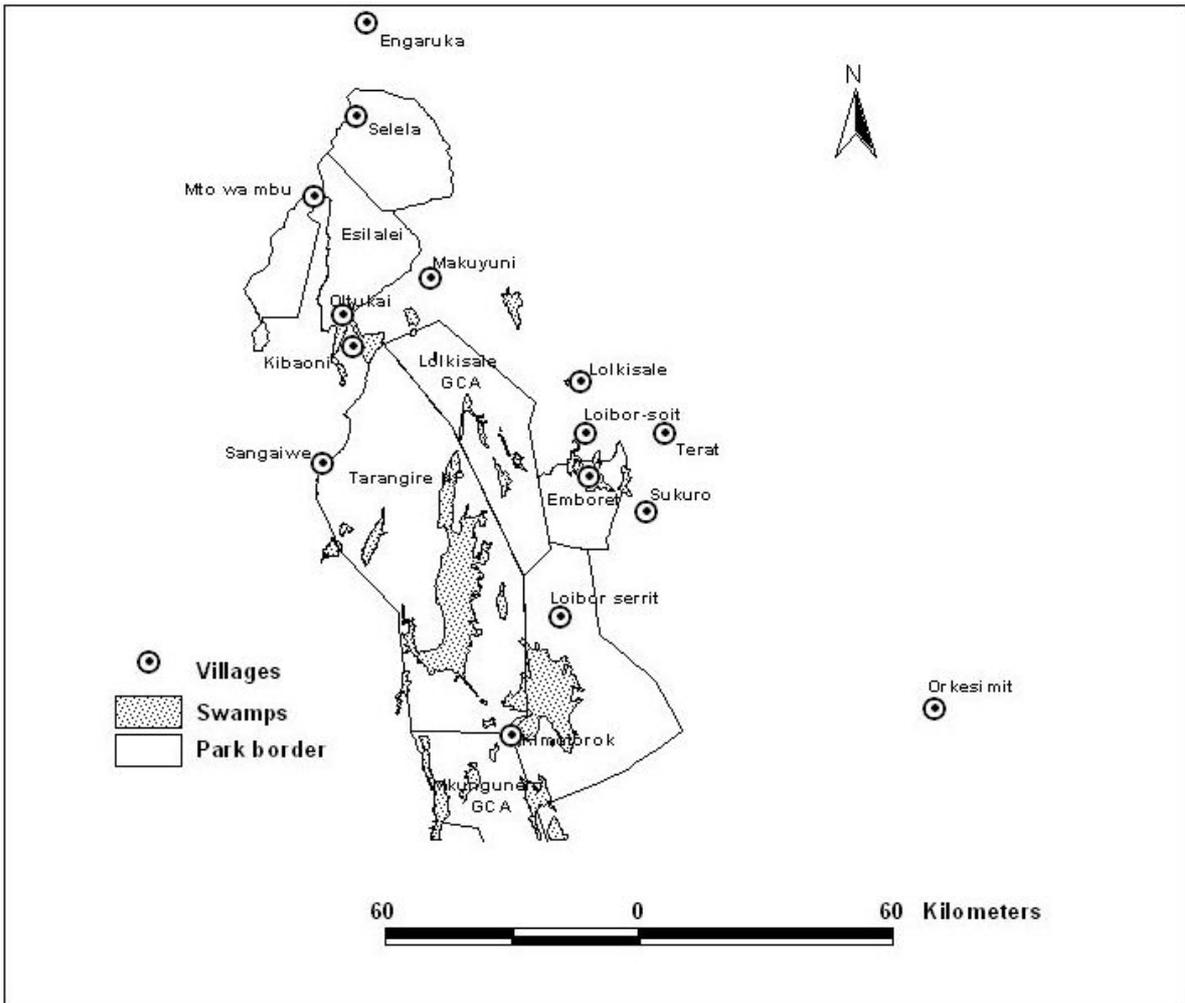
### ***Study area***

The study area extends from Tarangire Park into villages outside the park spanning out the Tarangire-Manyara Ecosystem (TME). Inside the park, it stretches from the northern tip of the park down to about 80 km southward. To the outside, it covers most of the villages abutting the Park to the north and eastern boundaries in dispersal areas (Fig. 1).

### ***Field data collection***

Radio telemetry is used to aid locate lions and collect information on a regular basis. Five lions from five different prides are fitted with radio collars, and are regularly tracked using a vehicle. A fixed wing aircraft is used on a monthly basis to locate radio-collars that cannot be located from a vehicle. In addition to using radio-collars, information is also collected from un-collared prides found by actively searching for these prides in specific areas or by opportunistic encounters. Lions are individually identified using natural markings such as whisker spots and acquired marks such as ear notches, broken teeth or kinky tails etc. Information collected includes location, group size and composition, females' reproductive status and feeding activities and prey species.

The data on human-lion conflicts is collected by group and individual interviews with residents in villages outside the park using questionnaires.



**Figure 1:** Study area

**Results**

**Number, size and pride composition**

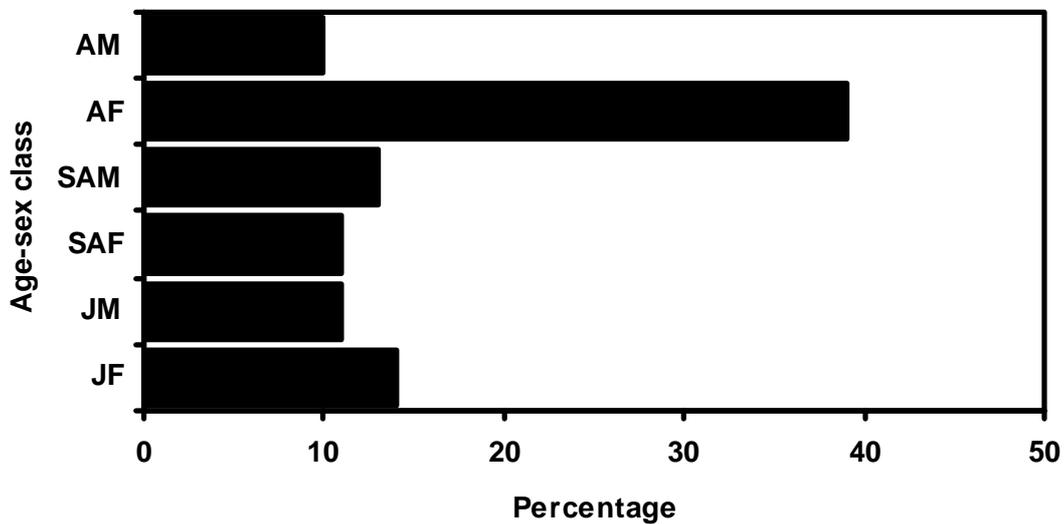
The age-sex composition of 201 lions seen in 2003-2005 is presented in Table 1. The average pride size for ten prides is  $18 \pm 9$  lions. A total of 17 adult males, 66 adult females, 22 sub-adult males, 19 sub-adult females and 73 juveniles were present in the population. Nomads are individuals that have not been identified to belong to specific pride.

**Table 1:** Age-sex composition for lions seen in 2003, 2004 and 2005

PRIDE	AM	AF	SAM	SAF	JM	JF	Jun	TOTAL
ALTIPIANO	1	5	0	0	6	4	3	19
LODGE	0	3	0	0	1	3	0	7
WAZI	0	6	1	6	3	2	0	18
NEW WAZI	5	4	0	0	1	3	3	16
SILALE	2	13	5	3	1	3	3	30
NEW SILALE	1	5	0	3	1	2	4	16
OLD SILALE	1	4	0	0	3	1	0	9
RIVER	2	7	2	2	0	2	2	17
TARANGIRE HILL	1	9	10	3	1	2	11	37
KURO	1	4	2	0	0	0	5	12
NOMAD	3	6	2	2	1	2	0	20
Total	17	66	22	19	18	24	31	201

Am=adult male (>4), Af =adult female (>4), SAm =sub-adult male (2-4 yr), SAf =sub-adult female (2-4 yr), Jm =juvenile male (0- 2 yr), Jf=juvenile female (0-2 yr), Jun=juvenile unknown sex (0-2 yr).

The percentage age-sex composition for the population for identified lions is 39% adult females, 10% adult males, 13% sub-adult males, 11% sub-adult females, 11% juvenile males and 14% juvenile females (Fig. 2).



**Figure 2:** Percentage age-sex composition for Tarangire lions in 2003-2005. Am=adult male, Af =adult female, Sam =sub-adult male (2-4 yr), SAf =sub-adult female (2-4 yr), Jm =juvenile male (0- 2 yr), Jf=juvenile female (0-2 yr)

While the difference in the proportions of juvenile males vs. juvenile females does not appear to be significant, and this is true for sub-adult males vs. sub-adult females, the proportion of adult males is significantly smaller than that of adult females (Fig 2).

### Male coalitions

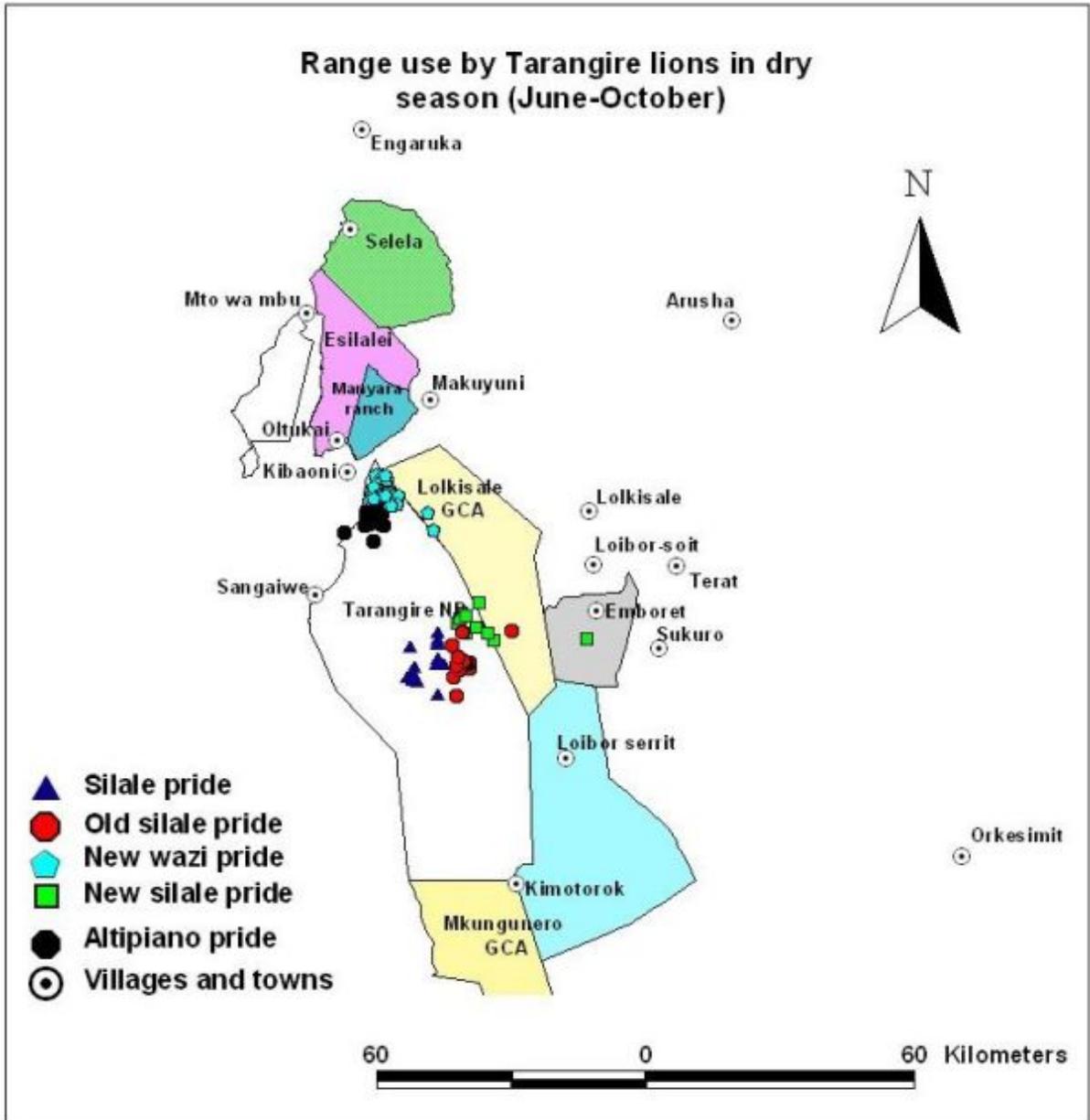
Three male coalitions have been identified to be resident with prides in the park. The northern male coalition with four males controls four prides to the north of the park; Wazi, New wazi, Lodge and Altipiano prides. The central coalition with two males controls River and Tarangire hill prides. In the Old silale coalition, only one of the two males remains after the disappearance of its companion, which presumably could be dead. Two other solitary males have been seen consorting with New silale and Silale pride females respectively (Table 3). It is not clear whether the solitary males control prides singly or they are part of large coalitions whose companions have not yet been seen.

**Table 3:** Number, size and approximate location of male coalitions in the park

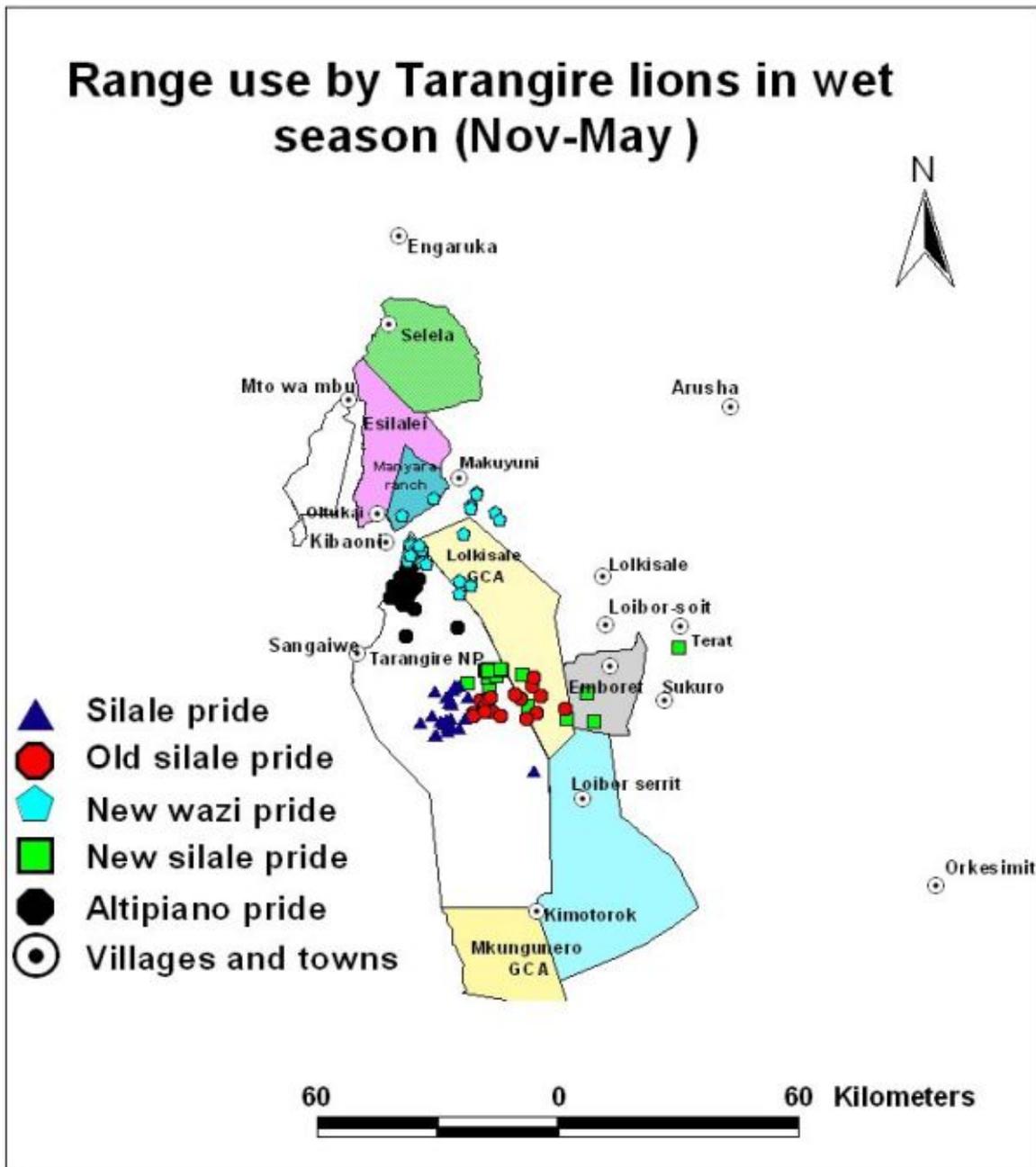
Coalition name	Coalition size	Approximate location in the park	Number of resident prides controlled	Name of resident prides
Tarangire North	5	Northern Tarangire	4	Wazi, New wazi, Lodge, Altipiano,
Tarangire Central	2	Central Tarangire	2	River, Tarangire hill
Old silale	1	Silale	1	Old silale
New silale	1	East Silale	1	New silale
Silale	1	Minyonyo	1	Silale

### Range utilization

The use of radio collars has made it possible to collect more information on how lions utilize their seasonal home ranges. In the dry season, lions mostly stay in the park, whereas they move well away from the park into dispersal areas in villages outside the park in the wet season (Fig 3a & b). Some areas used as wet season refuge by lions in dispersal areas have been identified and briefly described in Table 4.



**Figure 3a:** Range use by the Tarangire lions in dry season 2003 & 2004



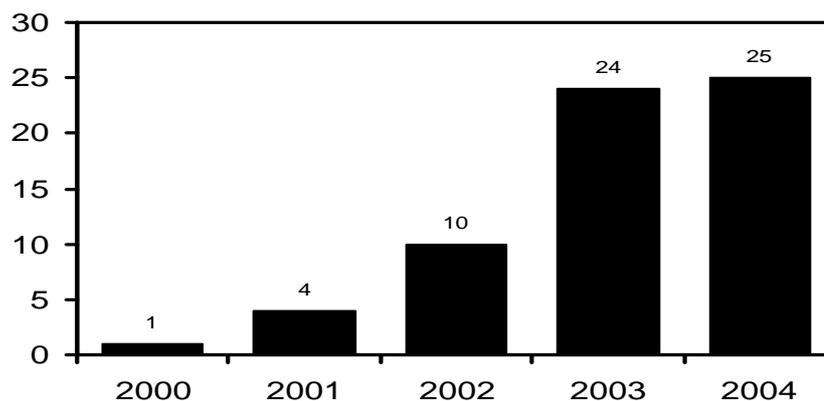
**Figure 3b:** Range-use by Tarangire lions in wet season (Jan-May 2004 & 2005).

**Table 4:** Description of the areas outside Tarangire Park utilized by Park lions during in wet season

<b>Location outside the Park</b>	<b>Area description</b>
North and North-eastern border	Areas about 14 km southeast of Makuyuni village, the areas are mainly used for farming. Pastoralism and hunting is also being carried out in these areas. Lions also utilized areas inside Lolkisale Game Gontrolled Area (LGA), which is mainly used for hunting.
Eastern border	Emboret and Loibor-serrit village areas: These areas are mainly used for human settlement, farming, pastoralism as well as tourist and resident hunting.
Manyara Ranch	To the north of Tarangire, the area is semi-protected with restricted access and controlled human activities.

### The human-lion conflicts

Thirteen villages from Monduli and Simanjiro districts have been surveyed for human-lion conflicts. The villages include Engaruka juu, Engaruka chini, Selela, Oltukai, Esilalei, Mswakini juu, Mswakini chini, Makuyuni juu and Makuyuni chini in Monduli district. Other villages in Simanjiro discttrict are Loibor-Soit, Emboreet, Loibor-Serrit and Kimotorok. The conflict is intense in most of the areas and this report presents preliminary results on the number of lions killed because of problem animal control (PAC) over the past five years. Figure 4 presents the number of recorded lions killed each year. At least sixty-four (64) lions have been killed over this period, twenty-five (25) of which were killed last year. However, the progressive trend in the number of lions killed each year, with the largest numbers in 2003 and 2004 than previous years could be an artifact of the lag period on the ability of interviewees to recall incidences of lions killed (i.e. the longer the lag period the fewer the incidences recalled by interviewees). Most of the incidences are associated with retaliatory killing of lions due to livestock depredation.



**Figure 4:** The number of lions killed in human-lion conflicts in villages outside Tarangire in 2000-2004

## **Discussion**

The Tarangire lions enjoy the safety of the park in the dry season when they remain within the confines of the park boundaries. However, in the wet season, there is insufficient food in the park and most lions migrate into dispersal areas outside the park following migratory prey. The dispersal areas generally are less protected, and lions do not enjoy the same safety provided by the park. While in dispersal areas, lions come into close contact with humans and their activities including pastoralism, agriculture and human settlements. This predisposes lions to persecution, poisoning and retaliatory killing due to livestock depredation. Since lions spend more than five months outside the park, the identification of critical refuge areas is important to understand where to focus conservation and management effort for long-term conservation of lions and other wildlife in the ecosystem.

Problem animal control (PAC) appears to be one of the biggest threats facing lions outside the park in addition to rapid human population growth, change in land use (expansion of agriculture) and fragmentation of wildlife habitat. Lions inflict economic loss to pastoralists through livestock attacks, and most lions are killed because of retaliation to livestock attacks, which also contribute to PAC and to negative attitude of pastoralists towards lions. The active participation and positive attitude of the people living in these areas is important for long-term lion conservation. It is equally important that the factors and pattern related to livestock depredation are clearly understood in order to devise management intervention to reduce the impact of the escalating conflict.

The discrepancy in the proportion of adult males vs. adult females in favor of females (Fig 2) suggests that males in the population could be experiencing higher mortality rate or high dispersal rate than adult females. The high mortality of male lions could result from PAC or could be associated with hunting of adult male lions in areas outside Tarangire. More data and analysis is needed to disentangle these competing hypotheses.