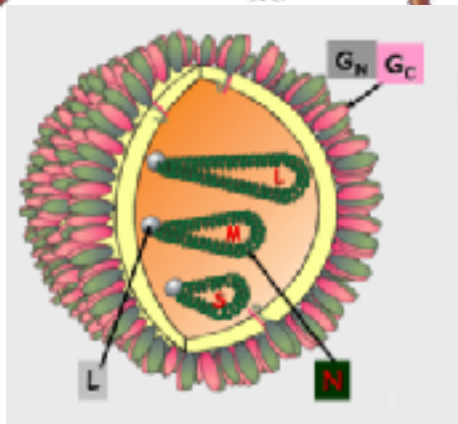




Ticks: prevention, intervention and control measures:

Hyalomma marginatum



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Tick control



The term "tick control" is a quite broad topic;

In this context;

- Tick species and environmental condition are the most important parameters

Up to now, a wide variety of strategies have been utilized to reduce tick abundance

- When we look at the history of tick control;

We can see some practices that can be referred to as "Early Tick Control (Before modern chemicals, 1900s)

Those are traditional and indigenous practices

These included;

- manual removal of ticks from livestock

(we observed that this practice was being used in Türkiye)

- this practice has largely decreased due to awareness of CCHF training programs

- the use of smoke, ashes or oil (like tar)

However, these practices were local and often not widely documented



Early Tick Control was followed by the chemical control period

-In this period, we see

-Introduction of Acaricides:

-Organochlorines (e.g., DDT):

-Organophosphates and Carbamates:

Ø With the discovery of arsenic, an important period began

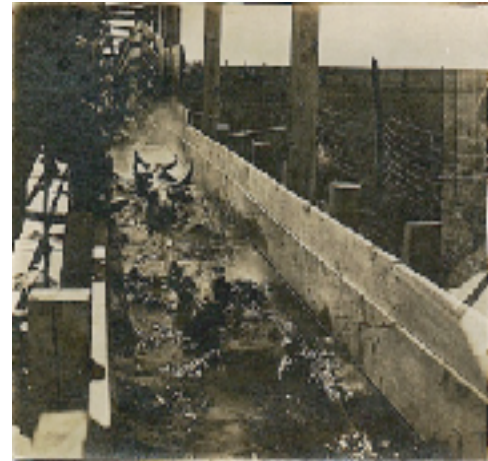
Ø (it is a revolution)

Ø Intensive dipping program has been largely implemented using arsenic pools

But, these chemicals are toxic, leave residues in meat and milk, and cause environmental pollution

-The period of integrated tick control methods began (1980s–2000s)

followed by modern approaches (2010s–Present)



Tick control



Many factors complicating tick control efforts

- their complex life cycle and blood sucking process
- high reproductive capacity
- climate change
- drug resistance
- need multiple hosts (one, two, three)
- broad host range for feeding
- diverse habitat distribution etc.



When we talk about tick;

- Eradication** is the first thing that comes to mind in tick control (it sounds like nice thing)
- But, currently there is no “**miracle solution**” for controlling ticks

Tick control

- Complete tick eradication does not appear to be a realistic goal
- Moreover, it remains a controversial issue because it might result in
 - the elimination of enzootic stability for TBP
- It would result in highly susceptible host, if so
- The aim should be reduce the tick population at an acceptable level

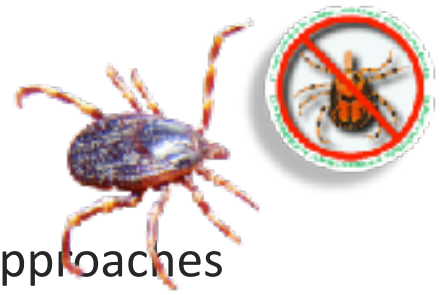


Low infestation



High infestation

Tick control strategies



Today,

-Scientific discussions of tick control are mainly focused on 3 approaches
(Each of these has advantages and disadvantages)

-1. Chemical control (Acaricide treatment of livestock)

(this strategy, if correctly applied, are efficient and cost effective)

-2. Biological control

(These agents are in principle highly desirable but their efficacy, manufacture, application and stability present serious challenges)

-3. Tick vaccines

(Current anti-tick vaccines, for now, do not provide a standalone solution)

Chemical control (acaricide treatment of livestock)

- The use of chemical acaricides has long been the main method for controlling ticks on animals

- Of these,

- The new generation pyrethroids seems to be the most effective against ticks

- In recent years, Studies have drawn attention to the use of certain botanical extracts and

- entomopathogenic organisms (**biopesticides**) (*Beauveria bassiana*, *Metarhizium brunneum* etc.)



Acaricide treatment of livestock

- Ø Flumethrin 1% is the most effective treatment
- Ø for tick control (*Hyalomma marginatum*)
- Ø It should be done periodic treatments
 - Ø The best way to reduce tick population
 - Ø Affects the following years population
 - Ø Treatment should be carried out simultaneously across the entire area on all grazing cattle
- Ø It should be done at least 4 applications
- Ø Start in the first week of grazing
- Ø It should be repeat every 25 days
- Ø For Türkiye,
- Ø The recommended months are April, May, June and July

10ml/100kg body weight



Advantages of using flumethrin (1%, 10 ml/100 kg body weight)

It is a new generation pyrethroid

Withdrawal period is very short in cattle (0 days?)

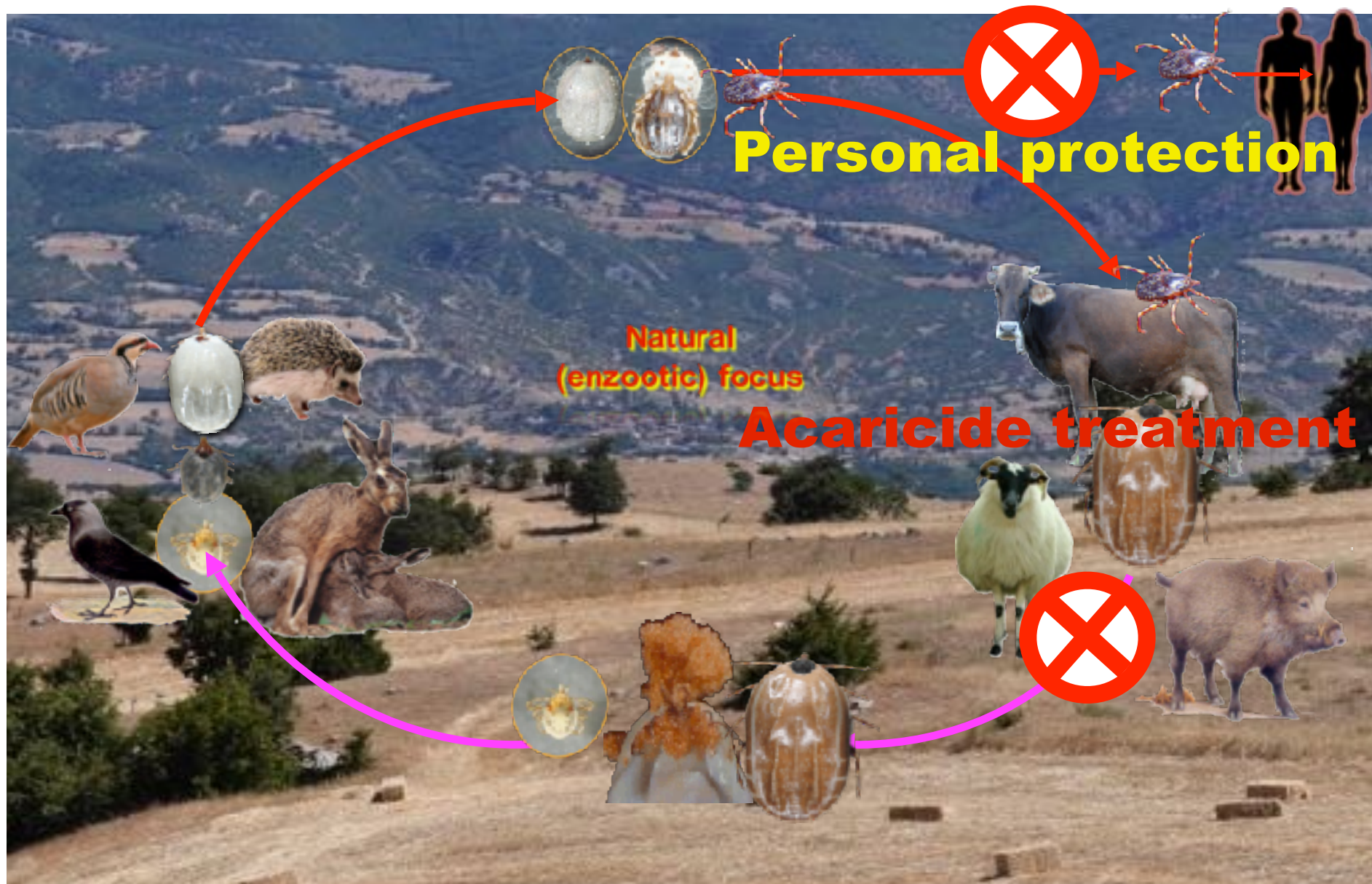
It has a long-action (21 days)

It is safest chemical for tick control ?



These are valid for now, however, some restrictions may be introduced in the future

There are two important points in the prevention of *H. marginatum* and CCHF



Field study overview

(flumethrin 1%, 10 ml/100 kg body weight)

Since the beginning of the CCHF outbreak, flumethrin has been used in cattle

- It has been carried out by Ministry of Agriculture
- I and Zati are members of the Ministry of Health's CCHF Advisory Board
- We act as observers during these field applications
- Our experience has shown that tick control presents many challenges
- We can say that the interval and repeated of application is important
- These two parameters are the most critical factors for effective tick control



Field study overview

In 2009, flumethrine was applied to cattle in three locations

(It was aimed to evaluate the efficacy of flumethrine for *Hyalomma*)



	2009	2010
Eflani	4 applications were made Interval treatment were 30 days	<ul style="list-style-type: none">* sharp decrease in CCHF incidence was observed* 19 ticks were collected from the field* (0.3 <i>Hyalomma</i>/person/hour)* Tick infestation rate was 1.77 <i>Hyalomma</i>/cattle
Çekerek	2 applications Interval treatment were 60 days	<ul style="list-style-type: none">* There was no change in CCHF incidence* more than four hundred ticks were collected* (15.4 <i>Hyalomma</i>/person/hour)* Tick infestation rate was high (>3 <i>Hyalomma</i>/cattle)
T Artova	2 application Interval treatment were 90 days	<ul style="list-style-type: none">* no change in CCHF incidence* more than two hundred ticks were collected* (21.8 <i>Hyalomma</i>/person/hour)* >3 <i>Hyalomma</i>/cattle

Acaracide trial 2013 (Cekerek, Türkiye)

This study was conducted between April and July in two villages of Yozgat province with more than five hundred grazing cattle

Animals were divided in three groups, two controls, one treated herd



Group 1 (Control Group 1)

Comprised of **38 cattle** managed individually by their owners. These animals were traveled **longer distances during grazing**. No treatment was applied; they served as an untreated control group.

Group 2 (Control Group 2)

Comprised of **32 cattle from a village communal herd**, managed by a shared shepherd. No treatment was applied; they also served as an untreated control group.

Group 3 (Treated Group)

Comprised of more than 4 hundred (n=450) cattle from the communal village herd, managed by the same shared shepherd.

The cattle in group 3 were treated monthly with flumethrine (1%)

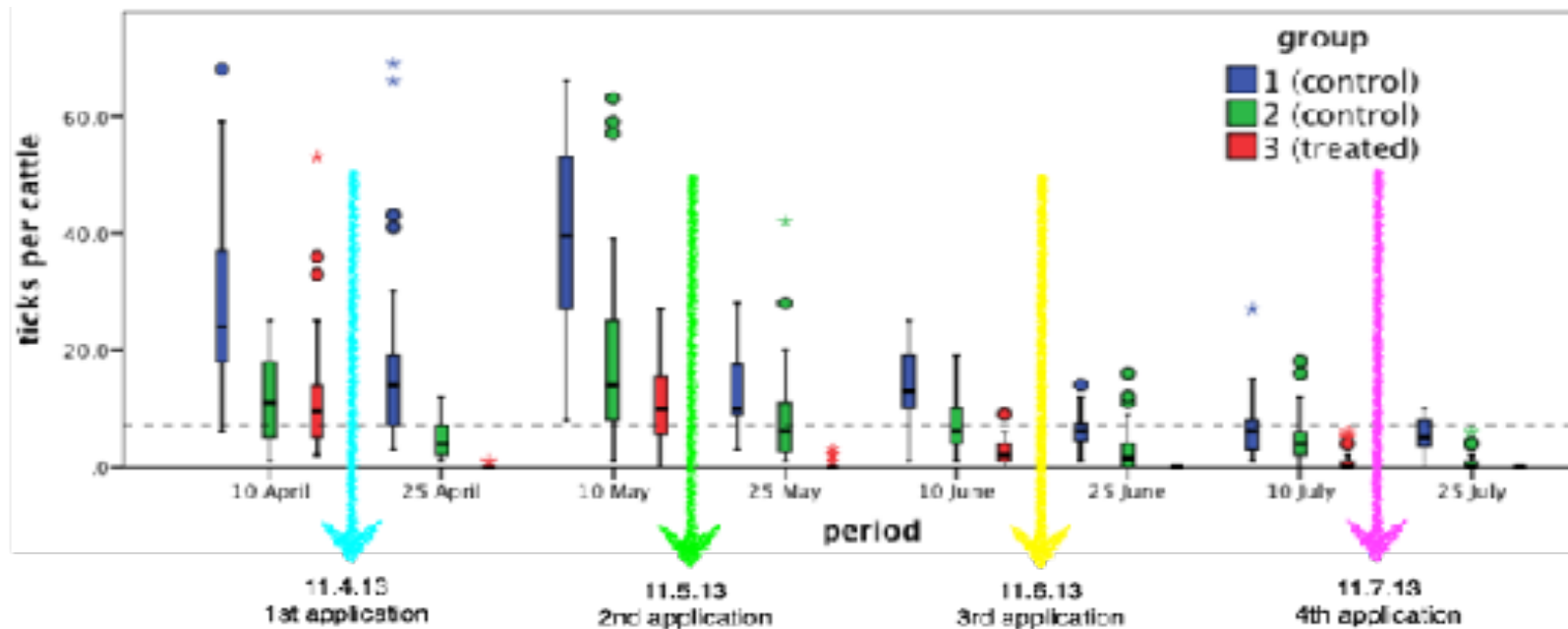
Tick infestation was monitored by randomly selecting animals every 15 days.

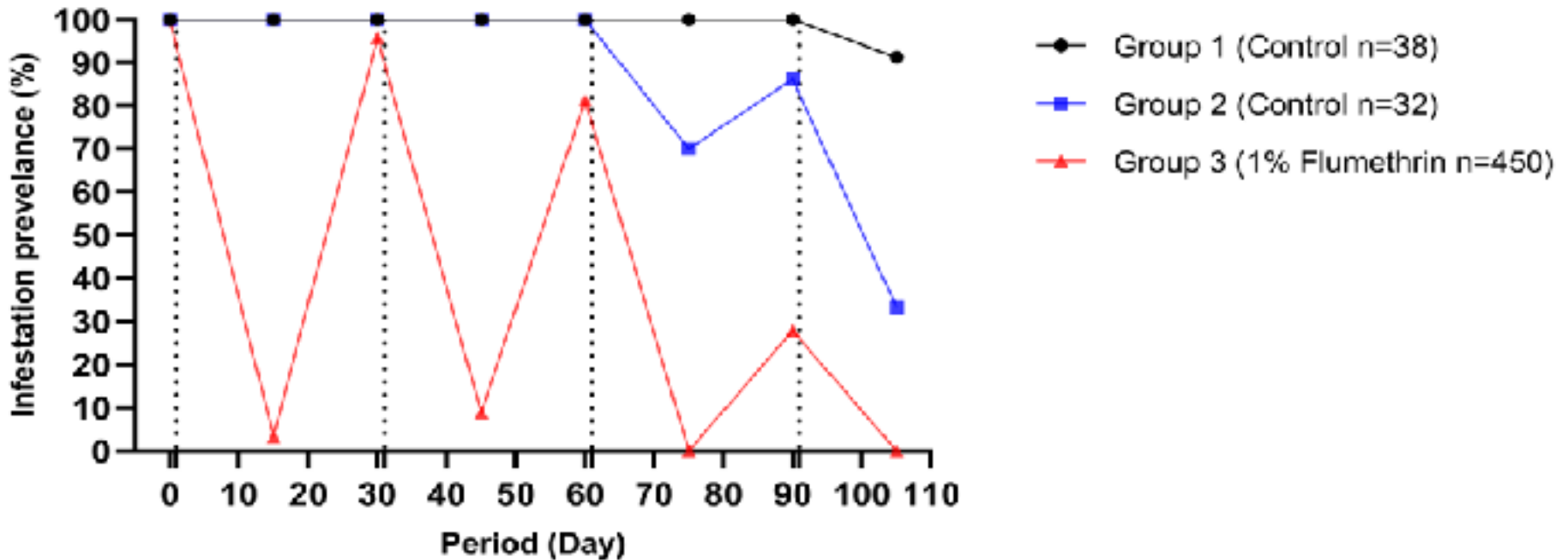
Acaracide trial 2013 (Cekerek, Türkiye)

More than five thousand ticks ($n = 5734$) were collected (98.6 % *H. marginatum*)

Tick infestation rate was 11.8 tick/cattle in untreated controls

1.2 tick/cattle in treated animals





The results of the study demonstrated that pour-on flumethrin (1%), when applied starting from the first week of grazing, was highly effective in controlling tick infestations in cattle.

Furthermore, reducing the application interval from 30 days to 25 days may improve the overall control of tick populations and maybe help prevent the development of acaricide resistance.

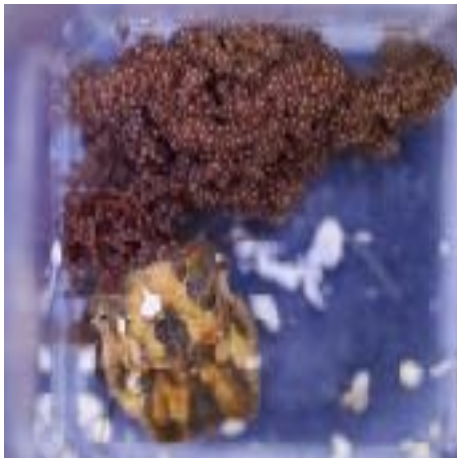
Acaracide trial 2013 (Çekerek, Türkiye)

(Field efficacy of pour-on flumethrin (1%) on tick infestations in cattle)

We concluded that starting from the first week of grazing, 4 periodic applications of flumethrin (1%) is very effective for *H. marginatum* control on cattle

If left untreated each cattle may feed at least 36 female *H. marginatum* ticks

We assume that these female ticks theoretically may produce more than 71 million larvae per village per season (36 female ticks/cattle x 570 cattle in the village x 3500 larvae/ticks = 71.820.000 larvae)



Personal protection

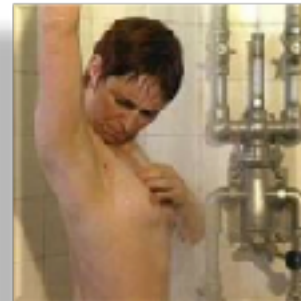
∅ Proper clothing may reduce the frequency of tick bite

- ∅ Long and light-coloured trousers should be worn
(and to tuck them into their socks)
- ∅ closed shoes, and long sleeved shirts should be worn



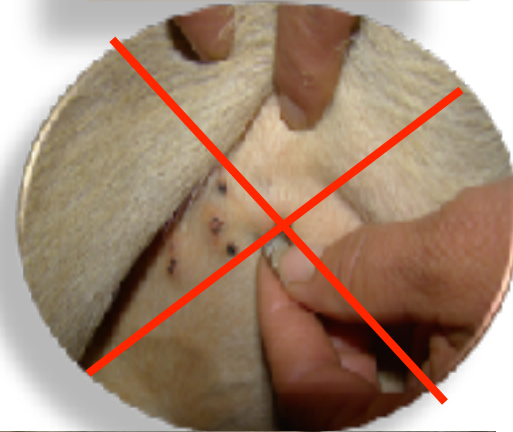
∅ Periodic body control is a part of tick control

- ∅ After visiting or working in tick-infected areas,
- ∅ Taking a shower is recommended and the body should be checked for tick infestation (**neck, armpits and groin**)



Personal protection

- Ø Any attached tick should be removed immediately
- Ø You can do it with tweezers, hanky, paper, leaves etc.
- Ø Attachment site should be disinfected
- Ø Do not detach ticks from animals
- Ø Especially, engorged female ticks can be dangerous
- Ø We have many CCHF cases in Türkiye due to
- Ø fully engorged females being removed from cattle
- Ø by animal handlers





Thank
you

